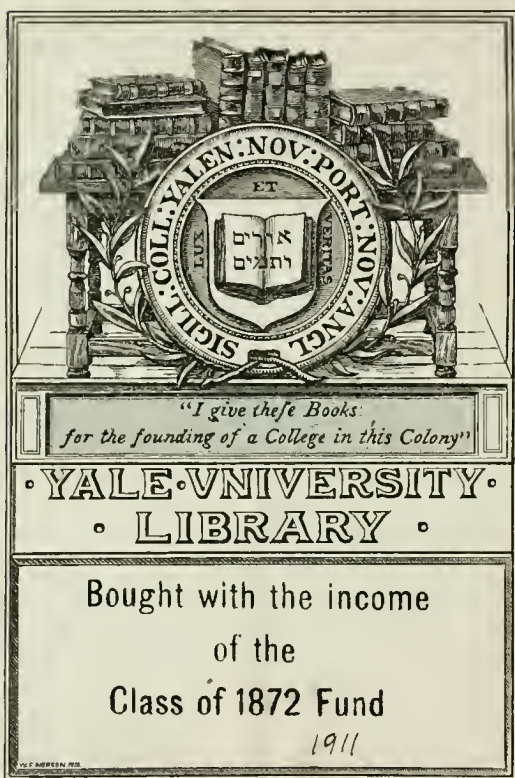


**IRELAND'S CRUSADE
AGAINST
TUBERCULOSIS**

III.—OBJECTS OF ASSAULT

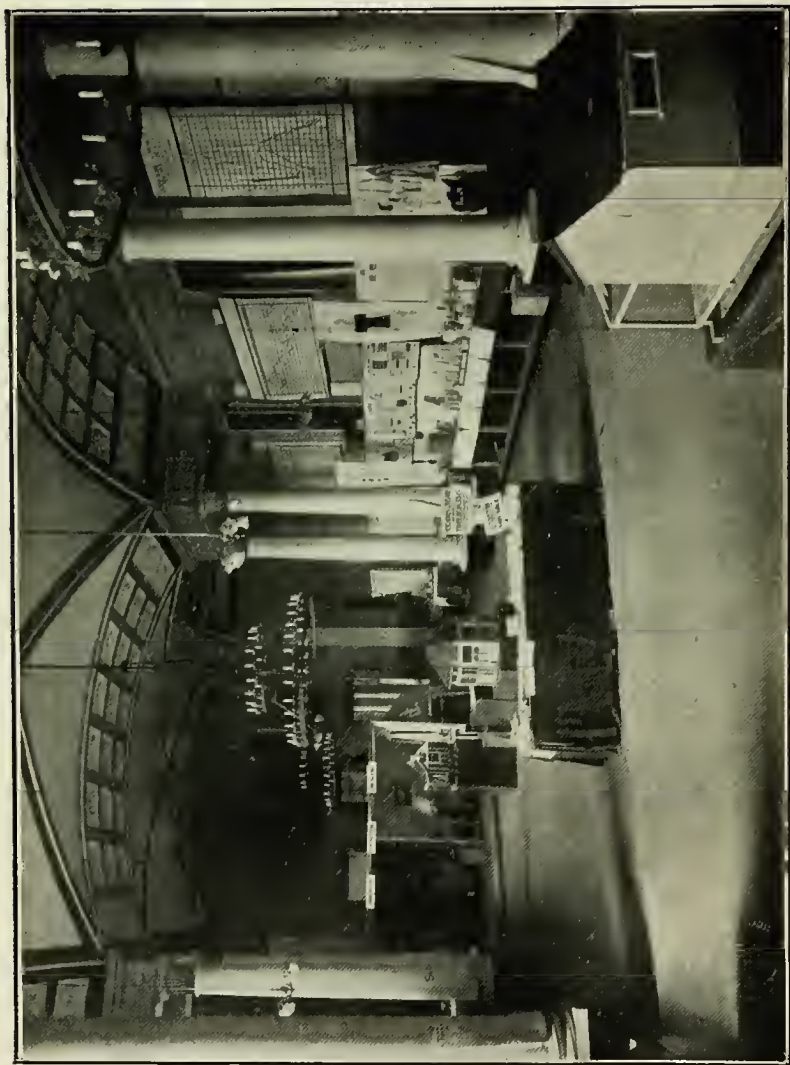
EDITED BY

**THE COUNTESS
OF ABERDEEN**



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IRELAND'S CRUSADE AGAINST
TUBERCULOSIS



THE TUBERCULOSIS EXHIBITION AT THE ROTUNDA BUILDINGS, DUBLIN, APRIL, 1909.

IRELAND'S CRUSADE AGAINST TUBERCULOSIS

Being a Series of Miscellaneous Lectures
delivered in connection with the Tuberculosis
Exhibition, together with other Papers
dealing with the Anti-Tuberculosis Campaign
and the Tuberculosis Prevention (Ireland)
Act, 1908

EDITED BY

THE COUNTESS OF ABERDEEN *President*
Women's National Health Association
of Ireland

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PREFACE

THE readers of Vol. I and II of this series must have wondered at the long delay in the appearance of our concluding volume, and we must sincerely apologise to the contributors whose valuable lectures have so long been kept back.

The reason for the delay will be understood when it is explained that the Women's National Health Association hope that the present volume may be of considerable value as a handbook for those who are concerning themselves with the working of the Tuberculosis Prevention Bill (Ireland), which comes in force on July 1st, 1909.

Copies of the Bill, together with an explanation of its provisions, prepared for us by the kindness of a lawyer, have already been circulated amongst the branches of the Women's National Health Association, and also to the Chairmen and Clerks of County Councils and Urban and Rural District Councils. These papers are now included in this volume, as also a reprint of the Report of the three Official Commissioners from Great Britain and Ireland to the Tuberculosis International Congress at Washington of September, 1908. This Report has been sent by the Women's National Health Association to all doctors in Ireland, in the belief that they would be glad to have so valuable a document in a convenient form for reference. The unanimous agreement of the three Commissioners on the important points raised at the Congress is a fact to be noted.

In addition to these papers an extract will be found

of the most interesting Report prepared by Dr. Stafford (Medical Commissioner of the Local Government Board in Ireland) for submission to the Washington Congress.

It is not possible to do more than reprint this extract, which is but a summary of the whole Report, and we venture to earnestly recommend anti-tuberculosis workers to purchase the Report as a whole.*

The examination into the causes of the disease in Ireland, as deducted from its greater incidence during school life than in Great Britain, and in its higher rate amongst women than amongst men, contrary to usual experience, are facts which require both pondering and action.

The final documents for which we have been waiting in order to complete this volume are the Instructions issued by the Local Government Board for the working of the Tuberculosis Act and the explanation of the class of cases notifiable in districts where Part I. is adopted by the District Councils with the approval of the County Council.

It will be noted that the cases thus notifiable are only those which are liable to be a source of danger to the community, and that the whole provisions for notification are much milder than those adopted in the State of New York, a copy of which is also included in this volume.

The Women's National Health Association hopes that its branches will bring before their local Sanitary Authorities and Councils the desirability of adopting Part I. of the Act, and also of taking advantage of the provisions of Parts II. and III.

* "Tuberculosis in Ireland," published by Ponsonby, Grafton Street, Dublin, 9d.

It should be pointed out that Parts II. and III. came into force on July 1st, 1909, without any further action of the local authorities, and that County Councils are thereby empowered to establish and maintain hospitals, sanatoriums and dispensaries, or to subsidise persons managing hospitals and dispensaries.

County Councils may also appoint bacteriologists for the examination of sputum, the examination of meat, milk, &c. They can also pay for the distribution of literature, for the expenses of lecturers, and the salaries of doctors and nurses in connection with dispensaries, hospitals and sanatoriums.

It is earnestly to be hoped that this Act will not be allowed to be a dead letter, but that official and voluntary health workers in Ireland will unite with the medical profession in making the greatest possible use of its provisions in the carrying on of Ireland's Crusade against Tuberculosis.

ISHBEL ABERDEEN,
*President of the Women's National
Health Association of Ireland.*

July, 1909.

The Registrar-General's Report for 1908, which has been published just as this volume is about to be issued, records a slight decline in the death-rate from Tuberculosis during 1908, whereby there are 386 fewer deaths than in 1907, 1906, and 1905. This is full of encouragement to all our workers.

PART I

BEING A SERIES OF MISCELLANEOUS
LECTURES DELIVERED IN CONNECTION
WITH THE TUBERCULOSIS EXHIBITION
UNDER THE AUSPICES OF THE WOMEN'S
NATIONAL HEALTH ASSOCIATION OF
IRELAND

THE CONTROL OF MILK SUPPLIES AND OTHER CONDITIONS AFFECTING TUBERCULOSIS

By A. K. CHALMERS, M.D., Medical Officer of
Health, Glasgow.

HIS EXCELLENCY THE LORD LIEUTENANT in the Chair.

BEFORE proceeding to consider in detail the control of our milk supplies it is desirable to ask whether the history of tuberculosis in man, and the experience gained thereby, furnishes any lessons which may direct our efforts towards lessening the prevalence of the disease in animals. We know, for example, that the disease is not known among wild animals, but is prevalent in those under domestication or in captivity; that it does not prevail amongst nomadic races so long as they retain their nomadic habits, but attacks them like other members of the human family if they take up their abode in towns; that it shows an increasing prevalence among fixed populations as aggregations become greater, and that it is excessively prevalent especially when poverty and ignorance lead to overcrowding of houses on soil or of persons in houses.

It is now many years since a distinguished Dublin physician (Dr. M'Cormack) called phthisis a disease of re-breathed air, and the history of the reduction of phthisis, both in the navy and the army, as well as in civil life, amply support the view that grossly defective

conditions of ventilation in working and sleeping apartments is a very powerful factor in predisposing mankind to invasion by tuberculosis.

At the very outset, then, of an inquiry into the methods by which it may be hoped to control the prevalence of tuberculosis in milch animals lies this question whether the past experience of mankind with regard to the disease in himself contains any suggestion which can be turned to useful purposes.

And a second, and equally important, question is whether our present methods of attacking the disease in animals indicate that we are in earnest in our efforts to accomplish its extinction. If we believe all that past experience teaches us regarding the influence which impure air, defective lighting, bad housing, insufficient food, and neglect of personal cleanliness exert in making us susceptible to consumption, what effort are we making intelligently to apply this knowledge to the housing and general management of our milk herds?

And here a question of administrative importance arises which must be answered.

If an urban local authority sets itself earnestly to reform its own cowsheds, and ensures by repeated inspection that no tubercular animals are yielding milk, what action is it to take regarding milk sold to its population, but obtained from other districts where the structural conditions of the cowsheds are insanitary and inspection of the milk herds is neglected?

When scarlet or enteric fever contaminates a milk supply, and the disease appears among the consumers, public apprehension, at least, if not legal action, promptly penalises the producer, because people, not unreasonably, refuse to purchase milk from a suspected source. The penalty falls on the individual cow-keeper, and rightly so, I think, because milk, even when obtained from a byre which conforms with every sanitary requirement of a structural character, may become contaminated by careless handling.

But tuberculosis as it reaches us through milk is more

insidious in its invasion, and, if we exclude the possibility of gross contamination by the cough or sputum of a phthisical dairy worker, it more commonly comes from diseased animals, and especially from those with tuberculous disease of the udder. Any carelessness, therefore, on the part of the cow-keeper as to the character of his herd is supplemented by remissness on the part of the local authority, and if they fail to ensure for the milch animals stalled in their districts the essential conditions of suitable housing, and at the same time neglect frequent inspection of the animals, my personal conviction is that the consuming local authority, which in most cases will be that of a large town, should have power to exclude from sale within its district any milk produced under the conditions described.

In Glasgow, as elsewhere, of late we have been able by inoculation of animals with samples of cream taken on arrival at railway stations, while in transit from rural districts to the milk purveyor in town, to demonstrate the presence of the bacillus of tubercle, and by subsequent visits to the producing farm and examination of the animals to discover the particular udder which was the source of the organism.

When, therefore, there is repeated illustration of this character demonstrating the continued neglect of any rural local authority to deal with sources of tubercular infection in its byres then it seems to me reasonable that the consuming authority should be able to exclude all milk from that district until it has been shown that the rural authority has become actively alive to its responsibilities.

Now, let us apply this to the control of our milk supplies.

Control of Milk Supplies.—It may be urged, I think, with a fair degree of reasonableness, that the defects in our milk regulations, and their failure to afford us the complete protection against transmissible disease, which we now regard as necessary, are largely owing to the circumstances under which they were first devised.

This legislation falls into three groups :—

1. *Dairies' Orders*.—First, and most important, of these for our present purpose are the various Orders which from time to time have been issued by the Local Government Boards of the several parts of the United Kingdom for the regulation of dairies, cowsheds, and milk shops.

But, as you know, these Orders go back for their ultimate authority to Section 34 of the Contagious Diseases (Animals) Act of 1878, and until the Amending Orders of 1899 included tubercle of the udder their application was limited to "disease" as defined for the purposes of the original Act—cattle-plague, foot and mouth disease, pleuro-pneumonia, and subsequently anthrax. And the original Act was not drafted with the object of protecting mankind from disease, but for controlling the spread of infection among our domestic herds.

2. *Public Health Acts*.—Several, and somewhat corresponding clauses in the Public Health Acts of each country contain provisions enabling sanitary authorities to prevent the sale of milk which is, or is likely to become, infected. But just as the Contagious Diseases (Animals) Act had originally in contemplation only those diseases which were peculiar to animals, so here the original conception of disease to which these clauses of the Public Health Acts applied was epidemic disease in man, of which scarlatina and enteric fever may be suggested as the type.

3. *Food and Drugs Act*.—Here again certain machinery exists for dealing with our milk supplies, but the original intention of these Acts was to deal with the adulteration and watering of milk, and chiefly had reference to departures from the normal constituents in given samples taken for the purpose of analyses. Only within recent times has the question been raised whether tubercle in milk or the presence of gross impurity, which could only result from careless handling, does not of itself constitute an infringement of the provisions of the Food and Drugs Act.

4. *Special Local Legislation*.—In addition to all these Acts, which are of general application, several sanitary authorities have obtained special legislation for dealing with tuberculosis in milk, and especially with tuberculosis of the udder. All of them, however, introduced a new principle of administration—namely, that of empowering the officers of one authority to visit the premises and inspect the conditions existing within that of another local authority. There are serious administrative objections in my opinion to this principle, as it must obviously tend to lessen the sense of responsibility of the local authority in whose area the cowsheds are situated.

None of these Acts, however, save the Dairies Order, deal with the conditions under which milk is produced, and this latter, I think, is the aspect of the question which most urgently demands our attention. And this for the following reasons:—

If I suggest to you that tuberculosis in our milk herds is only a particular illustration of neglected sanitation as applied to byres and cowsheds it is because I know you agree with me that tuberculosis in man is mainly associated with conditions which tend to produce a high-level prevalence of the other diseases which are dependent on bad sanitation.

Recall any city with which you are familiar. Locate within it those districts where poverty abounds and where neglected housing conditions arrest the eye, where irregularly planned streets and houses in too close proximity to each other result in defective lighting and ventilation of rooms, which always form an incentive to domestic uncleanness, and where indifferent scavenging is apparent, and there, almost without exception, you will, I think, find a high death-rate from phthisis and from the other diseases of respiration which indicate the vitiated atmosphere in which the inhabitants spend so much of their lives.

If I seem to put this strongly it is because I am thoroughly convinced that the true battle-ground against

tuberculosis in man is in the low standard of housing and sanitation generally which we are content to accept, and that while we may regard sanatoria for early cases, and homes of rest for those in whom the disease has almost run its course, as valuable auxiliaries in the work, yet the ultimate extinction of the disease will only be accomplished by removing the conditions which foster it.

A parallel illustration from our past history might be found in the case of typhus fever, which has almost become extinct, not, indeed, wholly because of rigid hospital isolation, but largely owing to the demolition of the slums and insanitary areas in which it found its home.

Infectivity is, of course, a factor to be reckoned with, but one even more powerful in the ultimate production of the disease is the depressed vital resistance in the individual, which all these things to which I have referred create.

It must needs be that in the course of a lifetime all are exposed in varying degrees to infection at one time or another, and yet the production of the disease would seem to be determined less by the fact of exposure than by the degree of receptivity in the individual. And it is here where the question of environment has such force, because the tendency of insanitary surroundings both of life and work is to enormously reduce the phagocytic function of the white cells of the blood, on the full vigour of which resistance to infectious disease would appear to depend.

It is from the point of view, therefore, of the history of the disease in man that I wish to invite your attention to the question of its repression among milk herds.

The Dairies Order, to which I have referred, empowers sanitary authorities to frame regulations for controlling the conditions under which milk is produced and sold within their several districts.

Everything, therefore, which tends towards stringency in the form of these regulations, and efficiency in their

application, depends on the view which may be taken by the sanitary authority of its responsibility.

And here it is that the first administrative difficulty occurs. What use have the local authorities made of this power of regulation? Does their action (and as officials we are all implicated in the answer) show that they have fairly grasped the valuable power which regulations supply to alter the environment of our milk herds. Obviously the first power which the Dairy Order gives to local authorities is that of making regulations, and the first part of the answer to the query just asked may be found in the following statement of the number of local authorities availing themselves of this power of making regulations. Broadly it shows that in England about one-third of the authorities have no regulations, in Scotland this proportion rises to 38 per cent., while in Ireland it is 70 per cent.

NO. OF AUTHORITIES MAKING REGULATIONS.

	No. of Authorities	No. making Regulations
England—		
Urban Districts	. 1,134	804
Rural	. 657	364
	<u>1,791</u>	<u>1,168</u> = 65 per cent.
Scotland—		
Burghal	. 250	139
Landward	. 107	82
	<u>357</u>	<u>221</u> = 62 per cent.
Ireland—		
Rural District Councils	213	45
Urban	95	43
County Boroughs	. 6	6
	<u>314</u>	<u>94</u> = 30 per cent.

But, having decided to make regulations, it is now asked what direct bearing these may have on the structure of the byre, and on the health of the animals stalled therein.

Nature of Regulations which a Local Authority may make :—

1. Registration of dairymen.
2. Inspection of cattle, and for prescribing the lighting, ventilation, cleansing, &c., of dairies and cowsheds.
3. For securing cleanliness of milk shops.
4. For prescribing precautions to be taken against contamination of milk.

In passing, it may be observed that registration is a much less effective way of controlling dairies than by licensing, which should be annual.

Inspection of Cattle.—Remembering the artificial condition in which animals kept for milk purposes are stalled, and the provisions of the Amending Order of 1899, which required that milk from tuberculous udders should—(1) not be mixed with other milk, or (2) sold as human food, this inspection becomes a necessity and should be frequent. It should be made by officers who are qualified veterinary surgeons.

Figures for Scotland.—It has recently been stated that under the 1899 Amending Dairies Order the number of cows examined in Scotland increased from 20,076 in 1900 to 38,309 in 1905, and that the percentage found affected with tuberculosis of the udder had fallen from 2.68 per 1,000 in 1900 to 1.12 per 1,000 in 1905.

Lighting and Ventilation.—Remembering the importance of these provisions, let us ask how they are applied, and for answer I shall quote you some notes which I had an opportunity of making during the present year in byres in several districts in Ireland.

Country Byres—Description of Cowsheds :—

1. Six cows kept, four in one byre, two in another.
 Large Byre measures $11 \times 12 \times 8$ ft. = 1,056 cubic ft.
 4 cows kept . = 264 cubic ft. per cow.
 Small Byre measures $12 \times 6 \times 6$ ft. = 432 cubic ft.
 2 cows kept . = 216 cubic ft. per cow.
 Both byres unlit and not ventilated.

2. A combined stable and byre; quite unlit, and with no provision for ventilation. Water supply from

adjacent stream, which even in local opinion is not good for drinking. Yet all the water required for dairy purposes, cleansing of vessels, &c., is obtained therefrom.

3. Has a small byre in a condition which is indescribably filthy.

4. No place for milk or washing vessels. Milk kept in uncovered vessels in kitchen, walls of which are damp. Horse kept beside cows. Water supply obtained from upland stream which comes through agricultural land.

Town Byres :—

1. Byre has stall for four cows.

Measures $12 \times 12 \times 8$ ft. 3 in. = 1,188 cubic ft.

4 cows . . . = 297 cubic ft. per cow

Lit by one window only, which looks into a porch. Openings above heads of stalls into wastage between byre and neighbouring building. No provision for storing milk; allowed to stand in court till removed by cart. Milk vessels washed in kitchen of dairyman's house.

2. Ten cows in space for twelve.

$42 \times 14 \times 10$ ft. = 5,880 total cubic ft.

12 cows . . = 490 cubic ft. per cow.

Heap of manure estimated at five tons (one ton per cart-load). Flooring of byre, "cobble," and caked with manure above asphalt.

Ventilation—two openings only, on same side as door. No through ventilation, and lowness of roof emphasises this defect.

Thirty-nine pigs kept in lie-to at end of byre with concreted floor, but no light save for a small "bole" in gable with door to it.

All these are in a yard surrounded by dwelling-houses.

3. A recently-built byre of substantial structure but defective ventilation. No milk-house or scullery for milk vessels, which are usually washed in house kitchen.

4. Byre has stalls for twenty-two cows, nineteen stalled at visit. Height of ceiling, 7 ft. 6 in. Lighting very defective; byre almost dark; air felt heavy owing to low ceiling and absence of sufficient means of venti-

lation; manure heaped against front wall; hay-loft over byre, and no milk-house. Milk dishes washed in back yard of house which adjoins.

5. Eighteen cows in a poorly-lit byre, with hens roosting in the rafters, and very inadequate ventilation. Floor of brick and not drained. Grips cleaned only once a day. Milk dishes washed in scullery entering off kitchen of house.

If, as I think, we should regard the extinction of tuberculosis as only a particular illustration of the general problem of combating all diseases which prevail most where insanitary conditions also prevail, we then bring it into line with general methods of sanitation, to which must be added such special measures as the degree of infectivity, which it possesses, suggests.

Primarily, therefore, we must revert to the conditions under which milk is produced, to the condition of the farm-steading as it affects the health of the workers and of the cattle kept for milking.

*Sanitary Requirements of Dairy Farms.**—Reform in

* In February, 1908, a new Dairies, Cowsheds, and Milk-shops' Order was issued by the Local Government Board for Ireland. It consolidates previous Orders, and is applicable throughout the districts of all sanitary authorities after 1st May, 1908.

Its structural provisions are so specific that they may be noted. It requires that every cowshed—

(1) Shall be lighted with windows or openings of not less than one-fifteenth of the floor area (Art. 3).

(2) Shall be ventilated—

(a) By inlets in the walls placed not more than six feet above the floor level, nor fewer in number than one-half the number of cows stalled, and having an area of not less than 15 square inches for each cow; and

(b) By outlets in the roof having a total area of not less than 20 square inches for each cow (Art. 4).

(3) Shall, if the cowshed is without a county borough, have not less than 500 cubic feet of air space; and, if within a county borough, not less than 700 cubic feet of air-space for every animal stalled (Art. 5).

(4) Shall have the floor properly asphalted, flagged, bricked, paved, concreted, or so constructed of hard and durable material that cleanliness may be maintained (Art. 7 (3)).

(5) Shall be drained by an open channel to a properly trapped drain inlet, situated in the open air, and discharging so that no accumulation of sewage shall be allowed on any ground or space adjacent to the cowshed (Art. 8 (1) and (2)); and

(6) Shall have a suitable and sufficient supply of water for all such purposes as may be necessary (Art. 9 (1)).

NOTE.—Articles 3, 4, and 5 apply to all new cowsheds and to existing cowsheds, unless it can be certified that equivalent provision for lighting, ventilation, and air-space can be made and maintained therein.

dairy-farming moves with a regrettable slowness. Dairy-Orders, Model Regulations, Local Regulations, all set up standards which but too frequently are not observed. In truth, we are scarcely in earnest about essentials, and but too apt—officials as well as dairymen—to look for some short cut which may rapidly lead us to what can only be got by persistent and patient effort.

The reform of the dairy-farm must, I think, inevitably precede the production of a pure milk supply. The inducement is strong to review the whole question of dairy-farming did time permit. The steadying ought, of course, to be primarily a house which is healthy to live in. But a house which is healthy for residence is not necessarily well adapted or well planned for a dairy business. The whole domestic life of the place should be, if possible, apart from the section given up to dairying. And here, water supply, sleeping accommodation, washing-houses, latrines, have their own proper place. But how often does one find a milk-house entering off some lobby which communicates with the kitchen, and a boiler for domestic washing beside that which is used for scalding milk-vessels.

It is in relation to the health of the stalled animals that we are chiefly at the moment concerned. The physiological requirements of healthy animal life are of the same general nature as those of healthy human life—fresh air, warmed if necessary (a most vital point in byres in winter months)—and this means good lighting and efficient ventilation.

Why do domestic animals only, and wild animals rarely, if at all, suffer from tubercle?

Time and again the lesson has been brought home that bad ventilation brings bad health, and particularly the form of ill-health we know as consumption.

Reform of Milk Supplies:—

Considering some practical questions for the reform of milk supply the following points may be suggested for attention—

1. *Age of Milk Herd.*—Although this is a purely

veterinary question, there is, I think, a growing opinion that there is a greater risk of tuberculous disease occurring among animals recruited from older stock.

2. *The Housing of Cattle*.—This has been already dealt with, but a question emerges which is of administrative importance—What penalty should a local authority incur which applies its regulations indifferently? In the ordinary infectious diseases the commercial lever itself operates, and the milk supply, which is acting as a distributor of scarlet fever soon ceases to find a consumer. But tubercle is more insidious in its attack, and if our theories regarding its prevalence and spread are even approximately correct, the structure of byres and inspection of animals require more attention than they get.

If, then, a consuming authority becomes aware from inquiry that time and again milk from particular districts is being sold to its population, should it not be in a position to ear-mark that district and to exclude milk produced therein from sale within its own district on the general allegation that its byres are insanitary and its herds insufficiently inspected?

3. There should be annual licensing of byres.

4. Frequent veterinary inspection of milk cattle with compulsory notification of udder and teat affections.

5. For a long time, also, the work of reform will be much assisted, I believe, by routine application of the bacteriological test to milk, preferably to cream, because it usually represents the output of several animals.

6. Slaughter of animals with udder disease.

7. Agreement upon a temperature standard for all milk on sale, and the seizure of such as contains gross impurity.

On the general question of the repression of tuberculosis both in man and animals there are many facts in our past experience which afford ground not only for gratification in its lessened prevalence, but inspire hope for the future, if strenuous efforts are directed against the conditions most obviously associated with its occurrence.



“GRAPES.”

Tuberculous new-growths upon lining of chest of an ox.

TUBERCULOSIS IN THE LOWER ANIMALS

By PROFESSOR METTAM, Principal of the Royal Veterinary College, Dublin.

MR. STEPHEN BROWN, J.P., Chairman of the Kildare County Council, in the Chair.

THE first question to consider is what tuberculosis really is. Tuberculosis is commonly called consumption, and it is due to the presence in the body, in the various tissues of the body, of a minute vegetable parasite, or the tubercle bacillus. As we know now this tubercle bacillus grows after it gains entrance into the body, and destroys the tissues, and if it produces serious effects in a vital organ the result is the death of the animal or the death of the individual that happens to be affected. Now, this tubercle bacillus is an extremely minute thing, but although it is very very small still, as we all know, its effects are very serious and often very disastrous upon the body or the animal that happens to carry it. The organism in length is only about the ten-thousandth part of an inch, while its thickness ranges from the fifty-thousandth to the seventy-five thousandth part of an inch. This micro-organism is found not only in the bodies of men but in the bodies practically of all animals, or, rather, we should put it, that it is capable of infecting not only men, but practically every other animal in the animal kingdom. Tuberculosis—this disease that is so common, unfortunately, in the human race—is also extremely common among the

lower animals. It does not suffice merely to say that tuberculosis is the "white plague," meaning thereby that it is a disease among men, that it is a scourge of the human race. It is also, indeed, an animal plague, a disease that causes serious mortality among all kinds of animals of however different species. Suppose we take a part that is diseased and examine it by means that are at hand in our laboratories where we work, we are able to see there in the material these bacilli, these germs, so that anybody can recognise them when they are pointed out to them. If we take that diseased material and place it in the tissues of an animal that is perfectly healthy, sooner or later that animal will show signs of tuberculosis. This tells us that the cause of tuberculosis is in the material which we have placed in the tissues. Supposing, then, we revert to the means and methods which are at the hand of a bacteriologist, if we try to separate the micro-organisms, as we can do, and get it to grow in pure culture—that is, pure culture not complicated by any other bacteria—and place it in an animal susceptible to tuberculosis, then we can set up in the tissues of that animal the disease of tuberculosis, and because we are able to do that we know that this particular micro-organism is the cause, and not merely the effect—that it is the actual cause of the disease. As soon as we know the actual cause of the disease we are able to make some effort, some progress, towards its eradication, because if we can prevent the entrance of this germ; this bacillus of tubercle, into the body of a healthy man or a healthy animal, then that healthy person or that healthy animal will remain free from tuberculosis, and will never be subject to tuberculosis. If we know something of the life history of this bacillus, if we are able to trace the way in which it acts on the tissues of a person or an animal, and if we are able by certain methods to prevent the entrance of the bacteria into the tissues then we are able to stop the disease. Remember it is a very minute organism. It may be conveyed into

the bodies of men and animals by various means, and I am going to tell you how, in the great majority of cases, this organism does gain entrance into the tissues. The organism of tuberculosis may get entrance into the body of men or animals by several different routes, by several different ways. It is possible for it to gain entrance in certain cases through the skin, not when the skin is intact, not when the skin is whole, not when the hands are without wounds, but only in those cases where there is a wound. In those cases the wound becomes infected with the material containing the bacillus of tubercle. It is possible in those circumstances that sooner or later a lesion will develop, and such a condition is sometimes seen in the face of a man whose skin has become infected, and is known by the term lupus. Here the probability is that the bacillus gets into the part directly. The wound may not be a large one; it may be a small wound, such as a scratch, but it is quite possible for the organism to get into the skin through this small abrasion or small opening in the epidermis. That is one way of setting up the disease, but it is not a very common one. Another way is by inhalation—that is, if one breathes the atmosphere in which there are a large number of tubercle bacilli, then tuberculosis will be set up. In this case the tubercle bacilli are conveyed by means of air down the windpipe into the lungs, and then, when they get into the lungs, the lesion of tuberculosis will develop. There is a third way, and, to my mind, it is the most common of all, not only in the lower animals but in man, and that is by the alimentary tract. The tubercular virus gains entrance into the tissues by passing through the wall of the intestine, the organism being taken in by way of food. There are lots of cases on record of tuberculosis of the intestines, and these cases have been traced in a very large number of instances to infection by way of food. If we take the case of the lower animals and examine the way it effects them we shall see how that statement which I have just made is manifested. Tuberculosis, as I have mentioned at the

commencement, is a disease that may afflict practically all animals. I do not say that all animals naturally suffer from it. I do not want you to go away with that impression, but I do want you to believe that it is a disease which may afflict all animals. Tuberculosis in the horse is not so rare as some people may imagine. Tuberculosis in the ox or cow is also all too common, as most agriculturists know, because they may have lost animals through the disease. Tuberculosis in the pig is common. Tuberculosis in the dog is not unknown or uncommon. Tuberculosis in the cat is not unknown. Although the sheep and the goat are rarely affected with tuberculosis they are not immune; they are not outside the possibility of infection. It is easy enough to infect the sheep or the goat if you go the right way about it; that is, experimentally. I do not say that the sheep here or in Ireland generally are affected, but I want you to believe that sheep may suffer from tuberculosis. As a matter of fact, we know that they can and do suffer from it. In this country and the United Kingdom and certain other countries there is probably not one sheep suffering from tuberculosis in 500,000, and, consequently, that being the case, you may take it sheep very rarely suffer from the disease. But, supposing you take those sheep that are free from the disease and place them along with cattle that are infected, then these sheep also will suffer from tuberculosis. The reason why the sheep does not suffer from tuberculosis naturally is because it is not housed or does not go in herds with other animals. But it may be infected, and if you place it with an animal that is infected then that sheep may also suffer from the disease. Now, that is not a fairy story. In some parts of the world—for instance, in Saxony—tuberculosis in the sheep is not at all unknown. In Saxony in the winter time it is extremely cold, and there are heavy falls of snow, and consequently the sheep are brought into the fold, where they are housed along with the cattle. The sheep that have tuberculosis get the disease from the cattle with which

they are housed, but so long as sheep are allowed to live as they are here, at home, in this country and never brought into the house they keep free from tuberculosis. All this points to the fact that tuberculosis is an infectious disease, and that one animal may get it from another. They are infected by tuberculosis just as much as men, and in some cases more so. Let us pass from mammals and let us go to fowl. Tuberculosis is common in the fowl. Some of you doubtless have seen cases of tuberculosis in fowl, and have not probably known what it was. There are cases like this. A certain person has a number of fowl which lose condition no matter what pains are taken to fatten them. If you kill them you will find their livers full of yellowish specks, sometimes like bran, scattered over the surface of the liver, and at other times you will find a yellow deposit even as big as a marble in the spleen. That is in most cases tuberculosis, and if it attacks the poultry run or the poultry farm it goes through it like an epidemic and sweeps them all off. Once you get an outbreak of that kind the most economic way to get rid of it is to change your poultry run and get a new lot, because those fowl that have been running together may all die from infection. I will give you an instance of that. A friend of mine told me one day that he had some fowl, the condition of which might interest me. I examined them and found there was tuberculosis amongst them. I said "I am afraid it will wipe them all off," and he said, "I do not know about that; we will see." I saw him about a month ago, and I asked him how many fowl he had, and he said only five out of one hundred and fifty. The rest of them had died. Tuberculosis is common in fowl, not only in the barn-door rooster and the turkey, but in the pheasant. Not so long ago I had a pheasant sent to me for *post-mortem* purposes, and I found it contained a lesion which was a mass of tubercle as large as a fowl's egg. That pheasant had died from tuberculosis, and the explanation why certain pheasants do suffer from tuberculosis is

not far to seek. A large number of pheasants are reared under fowl from eggs collected by the gamekeeper. These are put under barn-door fowl, and they are infected while they are young by hens which suffer from the disease. They associate with the hens and are infected in that way. Fowls suffer, then, from tuberculosis very frequently.

Whether the tuberculosis of the fowl and the tuberculosis of mammals, including man, is indeed the same disease I am not going to argue just now, but we know that the tubercle bacillus in the fowl is very closely allied to the tubercle bacillus found in mammals, and any difference observable is a difference merely of form—a difference of growth. The bacillus, from its environment, takes certain characteristics, while it loses others.

Not only does tuberculosis occur in fowl, it also occurs in still more lowly animals. Tuberculosis has been seen in the snake, it has been seen in the tortoise, and in certain amphibia. Frogs may even get it experimentally. It has also been seen in fish. It is not likely that you will find it in the fish of the river or the fish obtained from the sea, but in certain fish kept for experimental or ornamental purposes in parks or museums—that is, in fish that may be fed on human sputum—they sooner or later suffer from tuberculosis. Consequently, the statement I made at the beginning is true, that tuberculosis is the scourge of the whole animal kingdom. Therefore, if you are going to eradicate it from the human population you must pay attention to it in the lower animals. How can you get rid of tuberculosis from man if you have man living on tubercular animals? You must eradicate the tubercular animals. Do you drink milk from tubercular animals? If you do how can you escape? If you eat tubercular meat now can you escape? I say if you want to tackle this question successfully you must literally take the bull by the horns and eradicate tuberculosis in the lower animals as well as in man. Tuberculosis in man in most cases is undoubtedly of human origin. There is no doubt

that the greatest enemy of man from the point of view of tuberculosis is the consumptive man. A consumptive person is the means of spreading broadcast the virus of the disease. This virus when spread broadcast may be the means of infecting other persons. Therefore, I am quite prepared to admit that, so far as human consumption is concerned, the most common cases of it are of human origin due to the human consumptive; but what we have to deal with is the spreading of consumption or tuberculosis by the lower animals. Now I want you to remember that tuberculosis is more particularly a disease that gains entrance into the body by way of the alimentary tract—that is, the road pursued by the food. Let us take the horse, as it is probable that the vast majority of cases, if not every case, of tuberculosis is due to infection by the alimentary tract. The vast majority of cases that have been observed have been put down to the fact that the horse at some time or other has taken contaminated food. Cow's milk may have caused it, for, as you know, when young the foal may have received large quantities of cow's milk. The foal may have lost its dam, and may have been brought up on cow's milk. Again, the horse may be sick, and cow's milk given to it to nourish it. Now, that milk may contain tubercle bacilli, and the horse becomes infected. Horses are frequently sold or change hands, and the man who sells wants to get the best price for his animal. Consequently, he tries to give it the best appearance that he can. He is not particular about spending a few shillings or pounds in order to get it into condition, and he gives it things that he does not usually feed it with, and amongst these other things I may mention milk. A horse may be given milk when it is being prepared for sale, and that fact comes home to me rather strongly, because I recently saw a case of that in a magnificent horse that cost £150. He was a dray horse, and he was in fine condition when he was bought, but he became ill, and, remarkable to say, this animal did not lose condition. As a matter of fact, he weighed 17 cwt.

I made a *post-mortem* on that horse. He was said to be suffering from a malignant tumour, but it was really a remarkable case of tuberculosis. His lungs were full of lesions of tuberculosis. They contained numerous tubercle bacilli. Undoubtedly that horse had been infected by the tubercular bacillus brought in by his food. The probability was that he had been fed on cow's milk. At any rate that was the conclusion we came to after making inquiries, and you may take it that that horse was infected with the tubercle through the alimentary tract. Now take the pig. The pig is particularly prone to tuberculosis, so much so, indeed, that the last Commission that reported on tuberculosis—not the present one, but the one that went before it, the Commission that examined into the question of tuberculosis, more particularly from the aspect of the food supply—went so far as to say that even small lesions in the pig justified seizure of the carcase because the disease tended to become generalised in that animal. The pig is particularly readily infected with the tubercle bacillus.

Let us consider how the pig is fed, and what does the pig ordinarily get. Anything is good enough for the pig! Everything is thrown to it in the way of offal; anything that nothing else will take. "Give it to the pig" is a common saying. Refuse of all descriptions goes to the pig, and the pig pays a heavy toll, for it suffers very much from tuberculosis. The number of tuberculous swine is greater than is imagined. The pig cannot help himself. He has to take what is given. Very often the material that he gets contains tubercle bacilli, and a *post mortem* points to the fact that he has been infected through the alimentary tract. Now take the dog. The dog suffers from tuberculosis. In most cases the tuberculosis in the dog is traceable to contamination through the alimentary tract. Dogs, as everyone knows, go here and there picking up this thing and that thing. The dirtier the thing is the better he seems to like it. As a matter of fact the dog is a practical scavenger. Dogs eat up all sorts of refuse that is thrown out, but

I am not going to emphasise that point so much as certain other points with which I am familiar. Tuberculosis in the dog has been seen often among those pets that are kept in the house, more especially in those that belong to consumptive patients, and particularly bedridden patients, where the patient expectorates into a spittoon, and the dog cleans out that spittoon. The dog infects himself by taking up the sputum expectorated by the patient. Now, surely, that is a fact which makes us pause to think. If it is possible that a dog can be infected with tuberculosis by taking that tuberculous sputum, is it not possible should that tuberculous sputum soil anything which you and I may consume that we are running serious risk of sooner or later taking the disease? Now take the cat. It can suffer from tuberculosis. Cats go here and there and everywhere. We do not know where the cat takes his midnight walk, nor do we know where he often takes his meals or food. But we do know that he can become infected with tuberculous food, which is a very serious thing. I will give an instance of that which comes to my mind—a Persian cat, a very fine animal, at any rate it was a very fine animal when it was in good health. This cat developed a cough and ran off very much in condition. The owner of the cat—he happened to be myself—sent it down into the college to his colleagues to treat. The cat went into the college and died in a couple of days. I made the *post-mortem*, and I found his chest was full of fluid. He had intense tubercular pleurisy, and his lungs contained cavities with pus or matter, and undoubtedly tuberculosis was the cause of death. Now that cat was about my house, and when I saw the condition it was in after the *post-mortem* I gave strict orders in the house that everywhere that cat had been was to be disinfected. The place was disinfected under my own supervision, and as I was not prepared to say where that cat had not been we had the whole house disinfected. Where the cat got the tuberculous food I cannot say; he must have got it when

roaming about outside, but at any rate he died from tuberculosis. One of the glands was affected to an uncommon extent. The lungs were also affected, and I came to the conclusion that the virus passed from the lymphatic glands of the intestine into the blood stream and then into the lungs.

As I mentioned a moment ago, when the disease breaks out amongst them, the fowl are swept off. Let us see what are the symptoms of tuberculosis in the fowl. The fowl are noticed to be running off in condition. The fowl get diarrhœa, and are passing liquid material, and then, as we who have examined these things know, this material that they are passing contains tubercle bacilli. Now, the fowl infect the poultry run wherever they pass this tubercular material. Probably the housewife comes along by-and-by and spreads corn or other feeding matter on the ground. The fowl which had been healthy up to now pick up this corn, which may have come in contact with the tubercular material. The fowl that do that sooner or later become infected, and they, too, will die from tuberculosis. Tuberculosis in fowl is mostly contracted by way of the alimentary route. I have only seen one case of tuberculosis of the lungs in poultry, and that was not in the case of a barn-door fowl, but in a turkey. Tuberculosis of the lungs is rare in fowl. It mostly occurs in the liver or spleen, and as everyone knows who has studied the subject, it must have come in by the alimentary tract. So you will see that, so far as domestic animals are concerned, tuberculosis is a disease caused by contaminated food, and that, too, in a great number of cases, also applies to man; but I am not here to speak on that particular part of the question. Tuberculosis—the disease so prevalent in animals and man—is essentially at the commencement a local disease—that is to say, the disease at the commencement is confined to a little centre, and it may remain in that centre and never spread beyond that centre. It is not an unpreventable disease. Not only is it a disease which can be

prevented, but it is a disease which can be cured in its early stages. A large number of cases of tuberculosis are arrested in their early stages. It is only later, when the disease commences to extend from its local centre and gets into the body that it becomes incurable. Once it gets into the body and into the system there is no remedy. I have told you at the commencement it is essentially a local disease confined to the place where the virus enters, and, therefore, it may be said that part may recover. That may be so if it is arrested there, but once it gets out of that point into the blood stream the matter becomes serious. The disease is communicable from one to another. Supposing you get tuberculosis in any animal, and you take some of the diseased material from that animal and inoculate a healthy one with it you set up the disease in that animal. Furthermore, if you take the material from that second animal and you inoculate it into a healthy horse, dog, sheep, or cow, you can produce tuberculosis in all these animals. This has been proved up to the hilt by the present Commission. The next point that arises is—Is it possible for man to be infected from the lower animals? Unfortunately it is. Is it also possible for man to infect the lower animals? Animals have been infected by man. Men have been infected by animals. Fowl have been infected by man, and there are cases where poultry heretofore healthy have shown tuberculosis, and their history shows that there had been somebody about the place who had been suffering from the disease, and who had expectorated—who had been expectorating the material which comes from the lungs. There is a case of that sort on record in France, where a herd suffering from the disease had expectorated in the byres, with the result that the cattle became infected. Now I want you to consider the question—Can man be infected from the lower animals? A German Commission and a British Commission have been investigating this question because it is a very serious one.

Some of you may probably have heard that in 1901 the celebrated German bacteriologist, Professor Koch, of Berlin, stated at the London Congress that in his opinion tuberculosis in man and tuberculosis in bovines was not one and the same, and that man ran no risk from taking the disease from bovine sources, and that he did not think men were infected by the bovine bacillus because he had failed to infect bovines with human bacillus. There was no doubt Professor Koch stated what he found, but as soon as that statement was made it was not long before experiments were instituted all over the world. Very little time was allowed to elapse before the question was taken up. Many experiments were made, and what did they show? They showed that there was no truth in Professor Koch's statement. They showed that in at least 25 per cent. of the cases of children examined the micro-organism is an organism of bovine type, and that cattle inoculated with this organism took the disease and died rapidly. Now, when they have shown that, surely Professor Koch's case has failed. Surely, if they have proved that the bovine bacillus has infected children, and if even a single child is infected, it shows that man is not outside the range or possibility of infection by the bovine bacillus.

These Commissions have shown that the organism which grows with difficulty when isolated—that is to say, separated—from the bodies of children is of the bovine type. Further, they have shown that the most virulent organism to be obtained from animals is the bovine bacillus, that the bovine bacillus is much more potent, powerful, and severe when compared with the human bacillus. The bovine bacillus has been shown by the German and by the British Commissions to be infective to man. I can tell you of some cases which are practically equivalent to experimental cases, such as we see inside the laboratory. There is a case on record in Geneva, where the daughter of a medical man suddenly developed peculiar symptoms



TUBERCULOUS MEDIASTINAL LYMPHATIC GLAND.

It lies between the two lungs.



TUBERCULOUS PERICARDITIS.

The grey border is the tuberculous deposit.

which the medical faculty could not understand. Up to the time she was taken ill—she was then seventeen years of age—she had been a healthy girl. There was no history of consumption in the family for two or three generations. The girl died, and the father made a *post-mortem*, and he found that his daughter had died from tuberculosis of the abdominal cavity. He next considered the question of how she had become infected. It turned out that every week-end they went to the country to spend the Sunday on a small estate which the father had outside Geneva. A few cows were kept there. There were six in all, and an examination of these animals showed that four of them—an unusually large percentage—had tuberculosis. She was fond of drinking the milk fresh from the cows, she liked it warm—in fact, it was one of the greatest treats she had when she went to the country. The father saw at once how the infection had occurred from drinking the tuberculous milk of these cows, and so impressed was he with this fact that he actually called together his professional brethren in the city of Geneva, and they sent in to the authorities a joint statement with a request that all milk for human consumption should be guaranteed as coming from cows free from tuberculosis. The next case occurred in a convent in Chatres, in France. Thirteen young ladies in a convent developed what was diagnosed as tuberculosis, and immediately steps were taken to find out where the infection was likely to come from. In the meantime, six of these ladies died. Afterwards they found that milk consumed in the convent was provided by a cow with a tuberculous udder, and the medical man in charge of the case had no hesitation in saying that this was the source of infection. Now that is a very important point. If we want any more cases to show that consumption may be conveyed to men from the lower animals there are the records—the *post-mortem* records—of those who died through being infected with tuberculosis at the time of making the *post-mortem* examinations. Numbers of my own profession have

died from tuberculosis from making a *post-mortem* examination of tuberculous cattle. One is the well-known case of a veterinary surgeon named Moses, of Weimar, who, in making a *post-mortem*, inoculated his thumb. He was strong, healthy, and vigorous, and only thirty-five years of age, but he died as a result of the inoculation. These are things sufficient to convince anyone that there is a serious danger from tuberculosis in the lower animals.

Now, what is the conclusion to which we must come? The first one is that we must ensure that the food we take is as far as possible outside the possibility of being infected; that flesh meat, for instance, should come from cattle that are healthy, and that when the cattle are slaughtered the meat should be found to be perfectly wholesome. I am not going to say, and I do not wish it to be understood, that I think that one necessarily takes or gets consumption from eating flesh or beef taken from an animal that has been killed when suffering from tuberculosis. I do not think so because as a rule we cook our meat. We are not like people in some parts of the world who eat their flesh half raw or half cooked. But that is not exactly the point. When we buy meat we buy it expecting it to be wholesome. Sometimes flesh meat contains within it tubercular lesions, and that such occurs I know for a fact. It is not pleasant to have the spectre of tuberculosis rising in front of you when you sit down to your dinner. Therefore, I say the people who buy flesh meat must be protected. The man in the street is not supposed to know tuberculosis when he sees it. He has other things to trouble him. He has to earn his daily bread, and those who make the laws are supposed to look after him. The way the people must be protected is—it must be made certain that any beef that is put on the market for human consumption is sound, that it is wholesome and free from tuberculosis. How are you going to get that done? You require that your food should be wholesome, and if impure should be destroyed.

You will have to pay the price for it. It is not fair to expect another man to suffer loss in order that you may escape disease. If a butcher buys in the market legitimately a beast which he believes is one suitable to the wants of his customers, good and wholesome meat, and if he finds when he kills the beast that the meat is diseased, and if that meat is confiscated by the local authorities I say the authorities ought to compensate him. It is only fair they should do so. If you want to live in comfort, if you want to have a clean, wholesome house, you must pay for it. If you want the water brought into your house by the local urban council, if you want the streets cleaned and lighted you have to pay for it. If you want your health protected if a disease breaks out and you want the patients isolated you must pay for it. Now, in the same way, if you want to ensure that you are buying good, wholesome food—that is to say, if you are buying the flesh of animals, if you want to ensure that you are buying wholesome meat, and that you are not taking diseased meat, you require that that meat shall be inspected before you purchase it. Then, if that flesh is seized it is only fair the people should pay compensation. Let us take the case of a perfectly honest, upright tradesman, who goes to the market, where he sees a beast suitable for his particular trade. He buys it, and finds it is tuberculous. He has bought it in the market for £15 or £20. Now, it is quite fair he should suffer that loss? Not at all. If you want to keep that man honest you must compensate him for his loss. I do not say give him all the money he has paid. There is always the risk of the trade, and that must be taken into consideration; but he should not suffer the whole loss. In the same way, if an agriculturist has a certain amount of tuberculosis among his herd the other cattle are in more or less danger. If he destroys any particular beast or beasts that suffer from the disease he must suffer a certain amount of loss. It is not right that the authorities should be asked to compensate him to the full value of his loss; but there should be some

arrangement made whereby the authorities—and by the authorities I mean the central Government—should come along and say, “You have a certain number of tubercular animals. We will give you so much to clear them off.” That is the proper rational way in which tuberculosis should be treated. The thing must be taken in hand by the Government. If you want to stamp out tuberculosis among the lower animals the only way is to stamp out those which are infected. If you wish to sweep away tuberculosis amongst your herds you will have to follow the rules I have laid down, because every tuberculous animal in the herd is a direct menace to every other animal in it. Some time ago I had the opportunity of looking into this question in Germany in the province of Schleswig-Holstein. They have an arrangement there whereby all cattle that are infected with tuberculosis, all cattle that are clinically affected, animals that are coughing up tuberculous matter and swallowing it again, cattle with tuberculous udders, &c., cattle that pass infective material which is spread broadcast, these cattle are destroyed, and compensation allowed.

The cattle we consider clinically tubercular must be removed. You want to know how many there are of these cattle. Of course, I cannot say; but I can tell you what has been found elsewhere. In Schleswig-Holstein in the first year they found $4\frac{1}{2}$ per cent., in the second year $3\frac{1}{2}$, in the third $2\frac{1}{2}$. From that you will see the fall that has taken place, and it will be less later on. Now, surely the Government could afford to get rid of and pay for 4 or 5 per cent. of animals that are tuberculous—it would be less year after year—if by doing so they would save the other 95 per cent., especially as the 5 per cent. of animals that are infected are perfectly worthless, and may infect others. It may be that the owner thinks the animal is worth at least £3 or £4, and he keeps it for that reason. But I say take that beast and slaughter it; get rid of it or it will infect the others.

Now, lastly, as to milk. As I have mentioned

already, milk from tubercular udders consumed by families is a serious danger, not only to children, but to strong, healthy people, because it contains tubercle bacilli. The chances are that the people who drink it will become infected. Therefore, cattle that are suffering from tubercular udders should also be got rid of. They will come in under the 4 or 5 per cent. I spoke of a moment ago. If you are going to take up the question you will find it might not work out at more than 2 per cent. of cattle with tuberculosis of the udder, and surely for that 2 per cent. you are not going to let them infect other cattle, and possibly convey the infection to human beings. Even if it works out at a loss of £10 or £12 to do so what does it matter? If you are going to deal with the question you must be prepared to face some loss in order to avoid a greater loss.

A cordial resolution of thanks to the lecturer was carried by acclamation.

CAN THE FARMER AID IN THE EXTINCTION OF TUBERCULOSIS?

BY PROFESSOR THOMAS CARROLL, M.R.I.A.

Formerly Superintendent of Agricultural Education, Commissioners of National Education; late Chief Agricultural Inspector, Department of Agriculture, Ireland.

It cannot be too widely known that the most eminent pathologists agree that the bacillus which causes tuberculosis in farm animals is identical with that of the tuberculosis of human beings.

The discussions that have taken place in recent years on this vexed question are but an echo of similar discussions that worried scientific men many years ago.

If it were conceded that these bacilli were not identical then the question stated above would have its short reply—No!

Scientific research has during recent years made wonderful progress, and remarkable results have followed. The improvement in the instruments and appliances used in investigation work has been so great that we are made acquainted with phenomena in our age that were in a period not very remote classed amongst the incomprehensible.

Fortunately for humanity the disease tuberculosis has had its fair share of attention, and the knowledge of its nature and causation has been so far developed that we can now work in the light in providing means for its minimisation and possible extinction.

Cattle amongst domestic animals appear to be the most affected by tuberculosis, and from this source we

may expect the greatest danger for human life. It may be stated that if the agriculturist would at once boldly attack this ailment of cattle, immediate good results would follow.

It has been shown abundantly how danger to human life may exist on the farm, and it has been proved, incontestably that the cattle of the farm are largely responsible for the presence and continuance of the malady in urban districts.

This fact has been recognised in other countries, and sanitary laws have been enacted dealing stringently with tuberculosis in animals of the farm and with their products as supplied to towns.

Considering recently in how far the measures recommended by Bang in Copenhagen for dealing with tuberculosis in cattle were successful in saving human life I noticed remarkable results from his exertions.

The chart here produced gives some idea of the progress of the disease in Great Britain, Ireland, and in Denmark from 1875 to 1905.

It will be noted that considerable diminution in deaths from tuberculosis has taken place in England and in Scotland, whilst Ireland appears to continue its even course of a high death-rate from this disease. Indeed, Ireland started in 1875 with the lowest percentage of deaths from tuberculosis, whilst in 1905 it had the highest record.

It is, however, to Denmark we must look for the greatest reduction from deaths during these thirty years, and there can be little doubt now that this reduction was due—

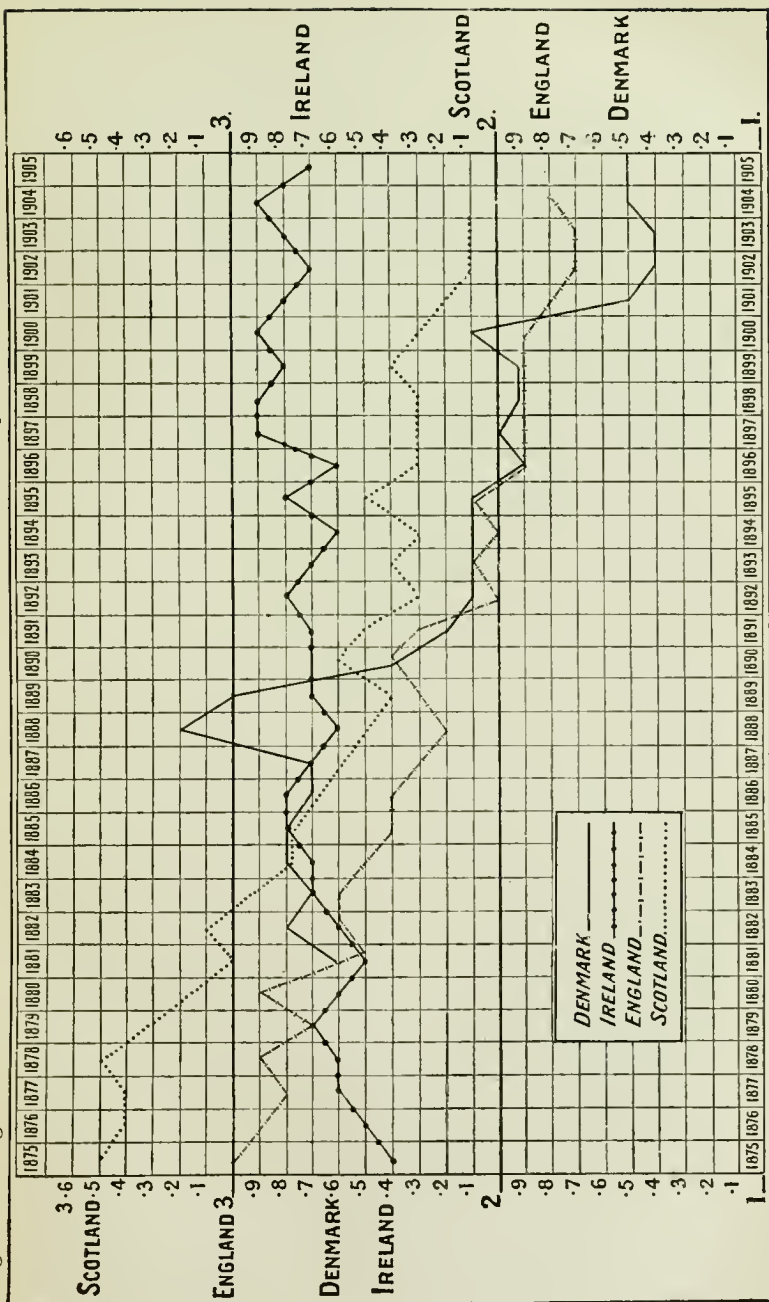
(a) To the exertions of Professor Bang;

(b) To the measures taken by the Danish Government to materialise Bang's suggestions; and

(c) To the great amenability of the Danish farmers to the influence of their scientific men that works through the governmental departments.

The keynote of the system is isolation. The method, briefly stated, is as follows :—Given a herd of cows, they

Diagram showing the Death-rate from Tuberculosis in Great Britain and Ireland as compared with Denmark, years 1875 to 1905.



are first of all subjected to the tuberculin test. This is done in Denmark, free of expense, by a Government expert, subject to the conditions laid down by Government for complete isolation and disinfection. Cows failing are separated generally in a building by themselves. These are for ever afterwards kept apart, and not tested again. Buildings where affected cows have been are then thoroughly cleaned and disinfected before sound cattle are admitted. The sound cows continue to be tested every six months, and any cow reacting is at once transferred to the isolated lot. On a number of farms where this plan has been carefully followed the results are gratifying—the disease having been completely eliminated in a few years. These herds continue to be tested every six months, but seldom have a reaction. Professor Bang does not think that the reacting cows should be slaughtered, but kept separate. He would have no fear of the calves from these cows; but the calves must be separated at birth. Even though the cows react, Professor Bang would continue to use the milk without hesitation, so long as the udder is not affected. The young calves in Denmark are fed by hand. They may get their mother's milk, even though affected with the trouble, so long as the milk is pasteurised; but preferably sound cows' milk should be used. The risk of contagion from animals going in the field is small compared with those tied up together in byres. The risk from affected beef the Professor thinks small. If the affected part is cut out he would allow the use of the carcase for human food. A reacting bull with tuberculosis should be kept by himself, but may continue to be used with every safety. Isolation as soon as possible, and as far as possible, is the wise and commonsense teaching on this subject by Professor Bang. Several of the herds visited had, under his direction, been cleared of the disease. In more than 90 per cent. of the cases treated the test has proved reliable.

The legalised procedure of Denmark is deserving of serious consideration in our country.

By an Act of 1893 dealing with diseases of animals in Denmark the moving of animals evidently suffering from tuberculosis to fairs, markets, shows, strange stables, &c., is prohibited. It is not allowed to sell or offer for sale the meat of such animals except after it has been examined by a qualified veterinary surgeon, and is certified by him as being fit for use. In the public abattoir of Copenhagen the examination of the meat before it is put upon the market for sale to the public is most thorough, and all meat affected by disease is branded in such manner that its condition is at once noticeable. A rigid suppression of the sale of milk from cows suffering from tuberculosis of the udder is in operation.

In order that farmers may be encouraged in aiding the authorities in the suppression of tuberculosis, another Act of 1893 was passed directing that an annual grant of £2,500 be allocated for the compensation of farmers who would voluntarily combat the tuberculosis in cattle. The use of tuberculin as a diagnostic, and the inspection of cattle and their isolation were made imperative as a condition for availing of this grant.

In 1898 a continuing Act was passed, and the amount of the grant was increased to £5,000.

It was further provided that all cows suffering from tuberculosis of the udder should be slaughtered, and the farmers owning such cattle compensated from public funds, and that no milk should be sent out from a dairy as food unless such milk had been heated to 85° C.

The regulations as to the sale of milk in Denmark are particularly rigid. By an Act, 5th February, 1904, in substitution to some extent of the Act of 1898, it is required that at all dairies milk and buttermilk shall be heated to 80° C. (85° C. is considered a better temperature for this heating. The chemical test—legalised—by which the heating may be detected is applicable only to the process of heating to 80° C. It is sufficient to detect whether this temperature has been attained.)

All cream churned for butter-making must be heated to 80° C. No milk can be imported unless it is so heated.

An important provision is made for dealing with the scum found inside bowls of separators. This must be burned, as it was incontestably established that it contained a quantity of disease germs, and so should not be fed to animals.

The regulations as to the marketing of meat are at present under revision in Denmark, and a new stringent Act dealing with meat has been passed, but it has not yet been officially published in the *Danish Gazette*.

The reduction in the death-rate of human beings in Denmark is a remarkable instance of what may be accomplished by co-operation under scientific direction. In that country there appears to be an atmosphere of co-operation of the strongest character.

I have frequently thought that for Ireland this spirit of genuine and well-advised co-operation is most desirable.

We can learn a lesson from Denmark that, even in public health, co-operation may be a great aid. It is perfectly clear that the important decrease in human tuberculosis in Denmark was coincident with the measures taken for dealing with tuberculosis of the animals of the farm. It has also been made evident that much improvement is due to the spirit of co-operation and helpfulness that exists in that country. I have been unable to discover whether there is a mutuality of effort on the part of the medical men in Denmark with the veterinarian. Professor Bang, who is a M.D. of high degree as well as a veterinarian of world-wide fame, is chief of the Veterinary Department in Copenhagen. His double qualification has, doubtless, given him considerable aid in his successful dealing with tuberculosis in his country.

I may be permitted to observe that I consider much benefit to public health would result from a good understanding, otherwise a co-operation, between the medical profession, the veterinarian, and the farmer. Veterinary science and the education of the veterinarian have made considerable progress in recent times.

There is now no room for the charlatan or the cow leech. The farmer of the present day is beginning to recognise the value of science in his business, and a period of darkness in respect of human disease and the diseases of farm animals is being dispelled by the light of science, and we may have reasonable hope that we shall shortly see that the farmer *can* aid in the extinction of tuberculosis.

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I have to acknowledge the sympathetic help in information as to procedure in Denmark given me by Mr. Harald Faber, F.C.S., the Danish Agricultural Commissioner to London. As illustrating beneficial results from the use of the tuberculin test and isolation, Mr. Faber gives the following details:—

“In March, 1896, Count Wedell had all his cattle tested by tuberculin—in all 265 heads, of which 190 reacted, or 71.7 per cent. Classified as to age, the percentage of reacting animals varied from—

“33.3 per cent. among cattle below $\frac{1}{2}$ year;

“32.6 per cent. between $\frac{1}{2}$ year and 2 years; and from

“87 per cent. to 92 per cent. among cattle from 2 to 15 years.

“The healthy division has been tested with tuberculin every six months, and has gradually increased in numbers, except in May, 1900, when 38 out of 176 in the healthy division reacted, showing insufficient isolation. This is emphasised by the fact that 25 of the 38, being all full-grown cows, stood close to one another.

“The two divisions have been isolated by a brick-work division in the large cowshed during the winter, and have grazed in different fields in summer. Calves from reacting cows have been reared, but have been taken from their mothers soon after birth. Reacting bulls have also been used. The whole herd is now free from tuberculosis.”

TUBERCULOSIS: INFECTION AND DISINFECTION.

By C. L. BIRMINGHAM, M.D., D.P.H.; Medical
Officer for Westport, Co. Mayo.

H. E. THE COUNTESS OF ABERDEEN in the Chair.

ON last night one of our most gifted statisticians, the Registrar-General for Ireland, most skilfully analysed for you statistics collected by his department, which enable one to realise how our country is being scourged by consumption; and so forcibly did he emphasise the fact that this ruthless enemy is each year robbing Ireland of some 12,000 of its young people that he left this hall ringing with the ding-dong of our church bells, which every ten minutes of the long year are mockingly serenading some brother or sister to their far-off home. The special duty assigned to me this afternoon is to explain to you in the simplest language I can command the story of the tubercle bacillus, how he carries on his deadly warfare, and how he may be conquered. You will more readily understand what I have to say in reference to tuberculosis infection and methods of disinfection if I step somewhat without the strict bounds of my lecture to give you a brief description of the germ or bacillus which just twenty-five years ago was discovered by Professor Koch to be the true and only cause of consumption. The tubercle bacillus, as it has been named, is, as germs go, a fairly large bacillus. In shape it is somewhat like this wax match, its length

being eight to ten times its thickness, and both of its ends rounded much as the head of the match is. Some of the bacilli are straight and some slightly curved. Now, as to its actual size. You all have been reading in the newspapers descriptions of that monster steamship the "Lusitania." Well, the "Lusitania" is just as many times larger than this match as this match exceeds in size a tubercle bacillus! To be able to see these tiny objects the most powerful microscopes are necessary. The microscopes generally used for such a purpose are capable of making an object appear about one-thousandth larger than it really is. You will better grasp what this enormous magnification means when I put it that it would be equivalent to making an ordinary tea cosy look as big as the Sugarloaf Mountain. These tubercle bacilli are to be met with in every country quietly pursuing their mischievous work, with, unfortunately, greater success in our own than in most other lands. At one time we find them lurking in the food on which we are dependent, and at another secreted in the phlegm which the consumptive has carelessly cast on the ground—a slumbering volcano ever ready to disgorge its death-dealing venom.

Though of themselves the bacilli have no more power of locomotion than this lifeless match, yet so light are they—far lighter than the motes which you have often watched dancing about in a sunbeam—the slightest draught, a mere breath of air, will send them flying about a room until they reach some nook or recess where the air is perfectly still, or some moist object to which they can adhere. We can now study more closely tuberculosis infection or the conditions under which tubercle bacilli gain an entrance to the human body, producing the disease known as tuberculosis or consumption. And it is well for you to know that tuberculosis may attack any part of the body, but it is especially partial to the lungs, producing the disease commonly called phthisis; the membranes covering the brain known as the meninges. In this case

the disease which results is named tubercular meningitis; the intestines, most especially in young children, the infection being derived from tuberculous milk; the spine; the bones of any part of the body; and even the skin. This last form of tuberculosis is better known as lupus. The most common source of tuberculosis infection is sputum or the phlegm of a consumptive person. Such a person is capable of coughing up millions of tubercle bacilli even during a single hour. But bear this well in mind, as long as the phlegm remains moist the tubercle bacilli are as securely locked up in the sticky mass of phlegm as flies in amber; but let the phlegm once get thoroughly dried, then there is no longer anything to hold the bacilli, and the first current of air which comes along floats them up and blows them about to the common danger. They may ultimately settle on some damp surface such as a damp wall, and remain there alive for weeks, or they may enter the human body, carried in by the air breathed, perhaps directly into the larger divisions of the windpipe, or more likely get fixed on the moist surfaces at the back of the mouth. It is right for me to give this assurance, that it is unlikely that the tubercle bacilli can set up disease in the body unless it is wounded in some way, as, for example, by chronic bronchitis in the lungs, or by chronic disease in the intestines, or by chronic disease of any of the organs of the body, or by the chronic debilities set up by excessive use of alcohol, reckless living, or insanitary environment. It is highly probable that the great majority of the tubercle bacilli which gain an entrance to the body perish before they are able to set up tuberculous disease. How they perish is an extremely controversial matter. It would even seem that the conditions favourable to their activities are only provided where a part of the body is wounded by disease or debility. Outside of the body, so long as the bacilli are protected from sunlight, which is rapidly fatal to them, and are not exposed to extremes of temperature, they not alone will live, but, if food be

abundant, multiply at an enormous rate. An enterprising bacillus who may wake in the morning to find no child about him to fetch his slippers, at sundown may have a tidy little family of twelve or fifteen millions of young germs to minister to his evening comforts! Hence you see the little volcano of tuberculous phlegm which the consumptive may thoughtlessly eject on the floor can not only let loose the germs it contains, but may, under favourable conditions, become the distributing agency for countless new centres of bacilli production. I have good authority for stating that tubercle bacilli, even when dried, may retain their vitality for as long as three months. Great heat is rapidly fatal to the bacilli. Even in a temperature of 56°C . they will perish in forty-five minutes, while they will die if exposed to a temperature of 70°C . in ten minutes, 80°C . in five minutes, and they cannot live above one minute in a temperature of 95°C . The temperature of boiling water— 100°C .—is instantly fatal to tubercle bacilli. After what I have stated you can now, I think, easily picture to yourselves the sleeping apartment of the improperly cared for consumptive, and almost see the elfish little germs glaring at you as they sit perched on every curtain, and covering and carpet, and article of furniture in the room, fiendishly longing to reach you and kill you. Therefore, be warned, and forearm yourselves by scrupulously avoiding anything which may be calculated to debilitate you, lest unaware you get infected. There is a little consolation in the statement, which I make on the authority of several bacteriologists of repute, that in the breath of a consumptive person no tubercle bacilli are to be found. Before leaving this part of my subject I shall give you a short summary of proofs of the possibility of room-infection :—

1. At the Brompton Hospital for Consumption there are large ventilating shafts running upwards from the wards to the roofs. One of the hospital staff placed in one of these shafts glass plates smeared over with glycerine. After a couple of days he removed them and

examined them, and found on them an abundance of tubercle bacilli which were alive and active.

2. Another person placed a cage containing healthy guinea-pigs (guinea-pigs being animals which very readily contract and die from consumption) in one of the same ventilating shafts. The cage was removed in a couple of days. All the guinea-pigs thus experimented with developed consumption within a couple of months.

3. Yet another experimenter inoculated rabbits with dust collected from the walls of a sleeping room occupied by a consumptive person. The rabbits all developed consumption.

4. Professor Beaumetz reports the case where some twelve clerks were working in a dark, badly-ventilated office with a damp, uneven floor. No spittoons were provided. A new clerk came who had a cough and a habit of spitting on the floor. This clerk gradually developed well-pronounced consumption, and in the course of a couple of years died of the disease. But he had evidently thoroughly infected the office before he left, especially the badly-made floor. Soon one of the older clerks started with a cough, and in due course dropped out, and another and another until, within the space of twelve years, eleven clerks belonging to this office had fallen victims to consumption. Then Professor Beaumetz came on the scene and insisted on the office being thoroughly disinfected, ventilated, re-floored, &c. Result—No further cases of tuberculosis appeared.

5. I know of another such example in my own practice. Three successive assistants in a local shop, all young men of good stock, who had successively occupied the same sleeping apartment, fell victims to consumption, whereas the other assistants in the establishment, who had never occupied this room, escaped.

I do not think I need dwell any further on the possibility of room-infection, and I pass on to the source of infection which, next to dried sputum, accounts for the

greatest number of cases of tuberculosis—namely, milk derived from a tuberculous cow. When the milk is tuberculous as a rule an expert bacteriologist can readily detect the bacilli in it by a microscopic examination. But they are never so abundant in milk as in sputum. It is probable that milk is tuberculous only when it is obtained from a cow suffering from udder tuberculosis. Opinion is not quite unanimous on the matter, though the weight of evidence, to me at any rate, appears in favour of the view I have stated. I have not the advantage of knowing Professor Mettam's view on this matter, but I trust before the Exhibition closes he will deal with this interesting phase of the wide study of tuberculosis. An indirect proof that milk is a frequent causative agent of tuberculosis in young children is to be found in the statistics of the Registrar-General for England, which make it clear that the mortality from tuberculosis among children dying at the age when milk is the principal article of diet has increased in England of late years, notwithstanding the fact that the mortality from tuberculosis generally among persons of all ages has considerably diminished. And as the Registrar-General points out, during these late years, while an increasing number of infants and children have been dying, English mothers have been in greater numbers ignoring their duties to their offspring, and feeding their babies on cow's milk, to secure greater freedom to work in factories or to devote themselves to the pleasures of the park, the theatre, or the drawing-room. In a word, more cow's milk being used—more babies and young children dying of consumption.

A more direct proof of the infectiousness of cow's milk derived from a tuberculous cow is afforded by the fact that certain animals (pigs, &c.) fed continuously on such milk soon succumb to consumption. Veterinary statisticians inform us that about 15 per cent of oxen and cows in these countries are tuberculous. A very much higher percentage of dairy-fed cows are tuberculous. But few calves have this disease. Horses



AT THE DOOR OF THE W. N. H. A. DUBLIN PASTEURISED MILK DEPOT.

cats, dogs, sheep, goats, and asses but rarely contract tuberculosis. The practical questions here arise—How can I feel secure that my milk is safe to drink, and how can I find out if my cow is tuberculous? My answer to the first question is, boil the milk and boil it immediately it is delivered to you. Boiling kills all the germs in milk. With respect to the second question, here again I am glad I can give definite advice. Procure the services of a skilled veterinary surgeon, and ask him to apply the tuberculin test to your cow. This consists in injecting a fluid called tuberculin through a syringe into the cow. If the cow be tuberculous it will give what is called a “reaction” within twenty-four hours—that is, its temperature will become considerably raised at the same time that the cow becomes generally sick. Other methods of heating milk short of the boiling-point are advocated, and when properly carried out they are reliable means of destroying the tubercle bacillus, but they are very troublesome, and generally unsuitable in small households. We call methods of this kind pasteurising. There are many appliances on the market for pasteurising milk which can be confidently recommended for use in large institutions, hotels, hospitals, &c. But to the small homes of Ireland the only safe and feasible method available is boiling, which is the method which has the fewest serious objections. Many cities nowadays maintain at the public expense public milk depôts. I shall describe the plan followed at one of these depôts—namely, in Battersea. Here the director contracts with local milk-men to supply each morning milk guaranteed free from preservatives and to contain not less than $3\frac{1}{4}$ per cent. of butter-fat. This milk is first humanised—that is, made to be approximately of the same composition as human milk by the addition of cream milk, sugar, &c. Next it is bottled direct into boat-shaped feeding-bottles, one single feed being put in each bottle. This done the bottles are placed in a steriliser and heated to a temperature of 212° F. for ten minutes. Subsequently, they are rapidly cooled. The food is now

ready for distribution. Poor people can be supplied with this milk for their babies for an inclusive charge of 1s. 6d. per week for each baby. Only one feed is given in each bottle. When the bottles are taken to the homes of the consumers all that is necessary to feed the babies is to remove the stoppers from the bottles, and in their place put ordinary rubber nipples. The advantage derived is germ-free food of suitable strength, distributed in a proper quantity, in a sealed vessel, and thus safe from the pollution of the squalid tenement house. As regards tuberculous infection in meat I have but little to say. The disease rarely attacks the lean of beef, and practically never the lean of mutton. But of course in the dressing of a carcass a tuberculous gland may get open and its contents smeared over the meat. That is practically the only danger of tuberculous infection from meat. Ordinary oven heat will kill all germs on the outside of a joint of meat. If the joint be over six pounds or a piece of rolled meat over four pounds oven-heat cannot be relied on to kill all germs in the interior. But it is so rare that tubercle bacilli occur in the centre of the meat that we ordinarily ignore this as a possible source of infection. It is exceedingly doubtful if tuberculosis is ever contracted from eating butter or cheese.

The last mode of infection by tuberculosis I shall allude to is direct infection through a cut, as occasionally occurs to those working with tubercle bacilli in bacteriological laboratories.

Before proceeding to deal with disinfection I propose to tell you of an interesting instance of almost direct infection which I met with in my own practice. On the last day of 1903 I was called on to attend a country woman at the birth of her twin children. They were two very large and finely-developed boys. A remarkable circumstance about them was that each of them had odd eyes—that is, each had one eye brown and one eye blue. Further, one of them was born with two teeth. But these matters are outside my story. When the



CUSTOMERS OF THE PASTEURISED MILK DEPOT, DUBLIN, IN CONVERSATION WITH THE SUPERINTENDENT.

children were three months old I vaccinated them. Both were then thriving. I did not see them again for another year or so, until I was summoned to attend one of them, John by name. On examining John, who was the first born, and the stronger child at birth, I found him suffering from extreme tubercular disease affecting his fingers, wrists, knees, ankles, and toes. The other twin (Thomas) was in excellent health. My first inquiry was as to the feeding of the children. To my joy the mother told me she had suckled one of them and fed the other on cow's milk. I had almost jumped to the conclusion that John had contracted his tuberculosis by drinking the milk of a tubercular cow, when I thought it wise to ask which of the twins had the cow's milk. To my amazement I learned it was Thomas, the healthy child, and that John had been breast-fed! Here was a puzzle. The mother was a fine, strong woman. No sign of tuberculosis about her. The father had been in failing health for above a year, complaining of a cough, &c., but I was never asked to attend him. I was putting the mother questions about her husband's health when John, the sick child, commenced to cry most loudly. He was on his mother's knee, and she was failing to quiet him. At last, evidently in desperation, she called out to her eldest girl to fetch her father's clay pipe. It was brought, and the child greedily stuck it in his mouth, and gave us peace! Here was the missing link. The mother told me then that since John, the tuberculous child, was a couple of months old the only way she could get him to cease crying was by giving him the not very elegant comfort of sucking at his father's clay pipe. Later I saw the father, and found him in an advanced state of consumption. He soon after died. The other child, Thomas, has always been, and still is, quite healthy. The mother assured me that Thomas—sensible boy—never acquired the habit of sucking at the pipe.

I feel I cannot leave this subject of tuberculosis infection without epitomising for you the main evidence in

favour of the view that tuberculosis cannot be transmitted from a tuberculous mother to her offspring :—

1. Pathologists generally note the absence of tuberculosis in making *post-mortem* examinations on children who have died in their first month.

2. Professor Bolitz (of Kiel), who made 2,500 *post-mortems* on children of less than fifteen years of age at death, noted that he was unable to find any trace of tuberculosis in the cases of children who were under one month old. Most of the cases of tuberculosis found were in children between one and three years (the milk-drinking period).

3. Professor Bang found by removing at birth the calves from tuberculous cows, such calves grow up as healthy as other calves, and calves left to feed on their tuberculous mothers developed the disease.

4. Professor Koch noted similar results in the case of the guinea-pig.

5. Many clinical observers have recorded instances where a mother having developed tuberculosis and infected one or several of her children, had one other baby and soon after died, if this child was taken away by relations it grew up healthy.

There is, therefore, a strong presumption that consumption is not hereditary.

I shall leave to other lecturers to deal with the theories of immunity, predisposition, the path which the infecting germs take after entering the human body, as well as other subjects allied to infection, and proceed to give you some practical advice on disinfection. I have already explained to you the most approved methods of disinfecting food tainted by tuberculosis—milk, meat, &c. There is now left for me to deal with room-disinfection and the destruction of the infection in phlegm. The latter first. A consumptive person may require to expectorate indoors and when away from his home at work, recreation, &c. The safest plan indoors, if there be a fire convenient, is to expectorate on paper, or into a paper (Japanese) handkerchief, and burn it at once.

Otherwise, a suitable cup or bowl should be used, containing a disinfecting fluid, such as a 5 per cent. solution of creolin, izal, cyllin, lysol, or carbolic acid. For outdoor use a sputum-flask capable of being thoroughly cleansed is indispensable. I do not at all approve of the use of pocket-handkerchiefs of cloth by consumptives. They rub against clothes so easily, and scatter dry sputum about, that they must often be a source of re-infection to the individual. Soiled handkerchiefs, towels, sheets, shirts, &c., used by consumptives should be steeped in a 5 per cent. solution of one of the disinfectants named if it is not convenient to boil them immediately after they have been used. They should be boiled in any case and always. The habit which is common among young men in the country parts of Ireland of placing their pocket-handkerchiefs under their knees when kneeling is an abomination.

As to room-disinfection let this be a golden rule, whenever a person has died in a room of any form of tuberculosis, or whenever a consumptive person has ceased to occupy a room, that room should be as scrupulously disinfected as if it had been occupied by a case of small-pox. To disinfect such a room all moveable articles, such as bed-clothing, wearing apparel, carpets, curtains, hangings, &c., should be removed by some person accustomed to handle infected articles, to the public disinfecting station, and there disinfected by exposure to super-heated steam. All articles which are not suitable for removal should be thoroughly exposed—that is, furniture taken out from the walls, drawers drawn out, cupboards opened, pictures taken down, &c., and all the vents of the room, under the doors, in the window casings, the fireplaces, &c, thoroughly sealed up by stuffing them with paper or clothes, straw, &c. Then the room should either be fumigated with formaldehyde or exposed to a most detailed spraying with a reliable disinfectant such as one of these I have already mentioned—a 5 per cent. solution being used. When this form of disinfection has been properly carried out

additional security is gained by sponging the walls of the room and all hard articles in the room, such as furniture, with a 5 per cent. disinfectant, and finally mopping out the room, using a disinfectant soap. For several days subsequently the room should be well ventilated before being occupied again.

In places where no disinfecting chamber is available the plan I would advise is—

1. Burn all articles of little value.

2. Boil all clothes, &c., that will admit of boiling.

3. Seal up all vents in the room, expose all articles such as drawers, cupboards, &c., put mattresses standing on their edges, draw out from the walls all furniture and fumigate with formaldehyde, using at least twenty-five tablets of formal in each 1,000 cubic feet of air-space in the room. If no formaldehyde is available thoroughly spray the roof, the walls, the floor, and all articles in the room with a 5 per cent. solution of one of the disinfectants already named. For formaldehyde disinfection an Alformant lamp, which costs only ten shillings, seems to answer very well. These lamps are simple to use. They are heated by methylated spirits. Dry formalin tablets, which cost about two shillings and sixpence per hundred, are generally used. When in use the lamp should be placed in the centre of the room. After formaldehyde fumigation has been started a room should be left sealed up for at least three hours. At the expiry of this time the room may be entered and thoroughly ventilated by throwing open the windows. Subsequently walls, ceiling, floor, and furniture should be thoroughly sponged and mopped as before, using a 5 per cent. disinfectant. For the past eight years I have been following such a plan of disinfection with formaldehyde or spraying with 5 per cent. disinfectant in every instance in which I learn that there has been a death from consumption or a removal of a consumptive person, and I have never yet learned of a second case of consumption occurring in any house which has been thus disinfected. Even if disinfection thus carried out did not kill the

germs of consumption lurking in a room after a consumptive had left it—and I am of opinion that it does—as long as the public consider it a good safeguard it should be encouraged. Furthermore, it provides a most excellent stimulus to the people to inquire into the history of consumption, and to forearm themselves. I am happy to be able to say that those who live about me have such confidence in the value of disinfection where there has been a case of consumption that they invariably have all infected rooms disinfected where there has been a death or a removal.

My message is nearly ended. I have to thank you for your kind and indulgent attention to my remarks. Up to the present those who have taken part in this anti-tuberculosis campaign have devoted their principal energies to directing public attention to the best means of protecting the health of the community at large against tuberculosis infection. But we are not unmindful of the sick man, and other lecturers will give you some lessons of the new art of bringing comfort to those maimed by consumption and the most recent and authoritative views on sanatorium treatment.

THE MAYOR OF LIMERICK.—It affords me the greatest possible pleasure to propose that the thanks of this meeting be tendered to Dr. Birmingham for the very beautiful and instructive lecture that he has given us. It will be of great value to the local authorities who have come up here from the provinces to gather some information and carry it home with them for the purpose of administering the public health affairs of the cities and rural districts. The milk question is a question that will have to be dealt with, and dealt with in no mild manner, by the public health authorities. Although the twin that Dr. Birmingham referred to did not get the disease from the milk, at any rate the doctor clearly proved that it is very necessary that the sanitary authorities in towns should look after the milk for the sake of the poor children, because it is the poor that generally suffer from

the poorness of quality and other matters. As regards disinfection and the other things that Dr. Birmingham referred to, I see no difficulty in carrying them out if the notification of the disease is made compulsory. Of course, after death the medical officer knows it. If the disinfection is carried out it will be a step in the right direction.

I wish to refer to a grievance, and that is the housing question in the cities. His Excellency on Saturday mentioned the large number of beautiful cottages that are being built in the rural districts of Ireland. No doubt they are a great blessing to those who occupy them, and to those for whom they will be built later on. I find that money is given by the Government for the building of these cottages to the rural district councils at a low rate of interest. Now we in the county boroughs, if we are allowed to borrow the money at all, will be told to go to the banks for it, and it will cost us $6\frac{1}{2}$ per cent. You will not be able to build for less than £120 or £130 such cottages as those outside, and that means a prohibitive rent to the very poor in the slums of our cities. The Government should allow to the county borough councils money at the same rate of interest that they give it to the rural district councils, so that we can build houses for the very poor. If that is not done the cities will remain hot-beds of disease. It would not do to be building sanatoria all over the country and be keeping these incubators, because they *are* incubators. I have the honour to belong to a society, the members of which visit the poor in their homes, and for eighteen years except last year—being then Mayor of Limerick—I have visited the poor in their homes. I can assure you that they are not homes at all. In a tenement house room, not one-fourth the size of this hall, you would find seven in family huddled together. These are incubators. They have not got the sun to shine there. I avail of this opportunity to state this grievance under which we in Limerick and the other county boroughs suffer, inasmuch as we cannot build

houses for the very poor. I have great pleasure in proposing a vote of thanks to Dr. Birmingham.

THE REV. WILLIAM PROCTOR.—I have very great pleasure in seconding this vote of thanks. As a minister of the Church I do so with great pleasure, because I have come in contact with many of the poor. I am glad that the motion was proposed by the Mayor of Limerick, representing our civic authorities. And I should like to represent the Church here. Coming as I do in contact with the very poor in our City of Dublin here, I can assure you there is no scourge which is doing such injury to our corporal body as consumption. One of the numerous causes of infection was referred to by the Mayor of Limcrick, and that is bad houses. Some of the streets in the centre of the city are unworthy of our civic authority. What Professor Osler said the other night at the meeting of the Royal Dublin Society in regard to compulsory notification should be carried out. I feel that without that our civic authorities are perfectly powerless. They should be authorised to enforce the notification of consumption. In one case that I know of a family went into a house in which there had been two cases of consumption, and I was in a very delicate position, not knowing how to refer to the fact that consumption had been there before, as I was connected with both families. But I very quietly and gently stated that there had been consumption there. And when some measures had been taken to remove the paper from the wall it was found that there were no less than five papers on that wall. You can understand what a hot-bed of disease such a place was after two deaths from consumption had taken place there. I have much pleasure in seconding the resolution.

The vote of thanks was passed with acclamation.

DR. BIRMINGHAM, in acknowledging the vote of thanks, said: Your Excellency, Mr. Mayor, Rev. Mr. Proctor, ladies and gentlemen, I am very grateful to you

for the cordial way in which you have tendered me your thanks. I do not propose to refer to any of the matters referred to by the proposer or seconder of the vote of thanks. I confine myself to referring to one little matter, and that is sanatorium treatment. I have myself had to face in my own district the problem of providing a cheap sleeping shelter for consumptives, and I have had this model made—a model of a cheap sanatorium in which a consumptive person can sleep and live practically (model produced and explained). There are three windows to it which open upwards, and they are fastened to the roof by small buttons. In the day time the three windows can be kept open; at night one or more. The roof of the sanatorium I propose should be made of vulcanised felt, and the sides kept together on the principle of bracing. My object in adopting this bracing principle is to make it necessary that very little angle wood should be used, and, therefore, the shelter would be cheaper and lighter. The actual cost of a shelter made of wood on this bracing principle, with vulcanised felt as a covering, and measuring 10 ft. 6 in. in length, 8 ft. in width, 9 ft. in height in front, and 6 ft. at the back, would be only £8. Any intelligent carpenter could make you such a shelter for £8. The weight would be about 3 cwt., or perhaps $3\frac{1}{2}$ cwt. By attaching rollers and hooks to the corners it can be removed from one part, let us say, of the recreation grounds at the rear of a workhouse infirmary to another, according to the direction from which the prevailing winds blew. The reason that I bring this matter before you at this stage is that I had not this model prepared in time to send it for the opening of the Exhibition. I shall now hand it over to the Exhibition, and anyone who is interested in the matter will be able to examine it, and also to examine the detailed working plans which I have had prepared, and which any joiner can follow. I thank you very much.

The proceedings then terminated.

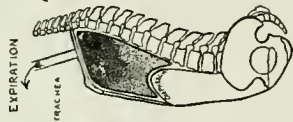
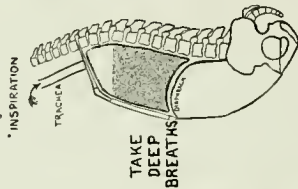
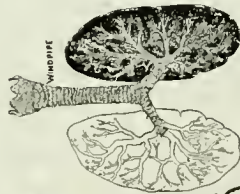
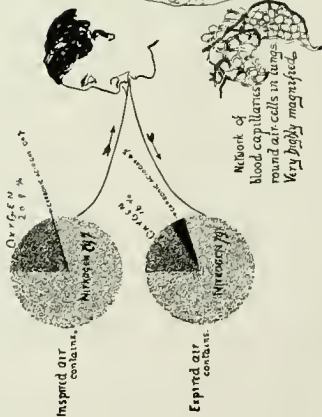
AIR AND HEALTH

Pure air is necessary for health

WHAT WE DO TO THE AIR

THE LUNGS

HOW WE BREATHE



An average adult breathes during rest about 17 times per minute and takes in about 30 cubic inches of air at each breath—that is about 425 cubic feet in twenty-four hours.

Inspired air contains—Nitrogen, 79 per cent.; Oxygen, 20.9 per cent.; Carbonic acid gas, .04 per cent.
Expired air contains—Nitrogen, 79 per cent.; Oxygen, 16 per cent.; Carbonic acid gas, 4 per cent.

GENERAL HYGIENE SECTION OF TUBERCULOSIS EXHIBITION.

Under the charge of Mr. G. Fletcher.

• AIR AND VENTILATION

By MR. G. FLETCHER, F.G.S.; Assistant Secretary in respect of Technical Instruction of the Department of Agriculture and Technical Instruction for Ireland; assisted in the carrying out of experiments by MISS NOLAN, of the Irish Training School for Domestic Economy.

H. E. THE COUNTESS OF ABERDEEN in the Chair.

I BELIEVE I am the only layman, or very nearly so, who has lectured in this course of lectures on tuberculosis. Perhaps some words of explanation may be needed as to my audacity in venturing to lecture under these circumstances. Happily, the subject I have chosen is one of the few subjects I might venture to lecture on. If there is one thing more than another upon which medical men are agreed it is that both with regard to the prevention and the cure of tuberculosis fresh air is one of the most essential needs. In looking through one of the many leaflets issued by this Association I notice one or two phrases that would justify perfectly a lecture on air. Here is one. "Fresh air and light in plenty help to prevent consumption; sunshine kills the germs. Live in the open air as much as possible. Outdoor work is decidedly better than indoor work. Breathe deep, long, full breaths, so as to carry plenty of air into your lungs. Do this every morning and night. Keep the windows open. Breathe through your nostrils and not through your open mouth."

We are, all of us, generally convinced of the need of fresh air, but we do not always take the best means to

secure it, and I want to-night to point out precisely the effect of fresh air, and how it can best be secured. In explaining this I will do so in plain untechnical language, but I hope not entirely unscientific language. I shall be obliged occasionally to call a thing by its scientific name, but what I have to say in regard to the air will, I hope, be plain to you all here. Our knowledge must have a scientific foundation. I propose to deal with the air, and to show you as far as I may what it is and what it is made of. In the next place I shall try to show you what we do to the air. We profoundly modify the air we breathe, and I want to tell you in what way we do so, and I shall show precisely what the air does to us, and by that time you will have arrived at the conclusion that fresh air is a very desirable thing, that breathed air is a pernicious thing, to be got rid of as soon as possible, and then we may seek some practical lessons from the knowledge we have acquired.

I shall have to ask you to bear with me while I repeat one or two experiments which will make it quite clear to you what the air is made of. As you are aware, we live at the bottom of an ocean of air. As fish live, move, and have their being in an ocean of water, so we live, move, and have our being at the bottom of an ocean of air reaching up I do not know how far. It becomes attenuated with increasing height, and at a height of two hundred miles would be exceedingly rare; but we have reason to believe it extends to that height. We learn that indirectly from meteors—those shooting stars that come through space and flash into a brilliant, though brief, existence in our atmosphere. The effect of their passage through the air is generally to reduce them to gas or dust before they reach the earth's surface, otherwise the result would be rather lamentable.

Now, we want to find out what is our relationship to the atmosphere by which we are surrounded. Either from a chemical or a physical point of view the study is exceedingly interesting. To learn all about the air, its movements, how they are produced, how they are

connected with the weather conditions, is a matter of the greatest interest and importance. But the first question we have to answer is—What is the air made of? And in that connection I do not think I can do better than reproduce what has now become a classic experiment.

We take a bell jar filled with air. The jar is divided by strips of paper into six equal parts. You set the jar into water, immersing it up to the first of the divisions; then take a piece of phosphorus and burn it in the air. You may fairly ask at once—Why a piece of phosphorus? Why not a candle or a piece of paper? Well, the answer is a simple one. The candle, in burning in the air, not only takes something from the air that we cannot see going away, but puts something back into the air that takes its place. Now, the phosphorus in burning takes something from the air, and produces as a result of that burning white fumes of a substance known as phosphorus pentoxide, which readily dissolves in the water instead of remaining in the air of the jar. We take a piece of phosphorus and place it in a small saucer, and float the saucer upon water in a dish. We place the bell-jar over it in the water, ignite the phosphorus by means of a hot wire and immediately put in the stopper. The phosphorus begins to burn, and immediately you see the white fumes of which I spoke coming off. These white fumes are made up of phosphorus and whatever has been taken from the air, and after a little time this dissolves in the water, leaving in the jar air minus the gas taken from the air by the burning phosphorus. In order to save time I may anticipate a little. It is not always wise to prophecy before the event, but, in this case, there is very little risk of the expected not happening. You will shortly see the water in the outer dish rise in the bell-jar; you perceive that the phosphorus is burning very fitfully. Why? Because the substance in the air that the phosphorus requires in order to burn is being taken away. It has nothing to live upon so to say. Living and burning, in one sense, are almost identical terms, for, just as that

phosphorus required something to produce this burning, so we, living creatures, take something out of the air in order that we may live. The two processes are very similar. What is the something taken out of the air necessary to produce the burning? It was explained long ago by the great chemist, Priestley. Mercury was heated in air, and after a while it was seen that a small quantity of a red substance was formed upon its surface. When that red substance was again strongly heated a gas was given off that had remarkable properties and left behind mercury. Mercury when heated for a long time yields a red powder. When that powder is strongly heated again, gas is given off, leaving mercury behind. That gaseous substance from the red powder was called oxygen. I have prepared for you oxygen from potassium chlorate—a substance which contains oxygen. This oxygen—the same gas that the phosphorus has taken from the air—is of the profoundest importance to our existence. Now, let us see what this gas is like. First, I will take a wooden spill, and, having lit it, put it into a cylinder filled with oxygen. You see this gas has the property of vigorously supporting burning. Perhaps you will understand that more clearly if I take a substance which does not ordinarily burn in air. I take a piece of iron wire at the end of which is a piece of sulphur. My intention is to cause the wire to burn, but to start it I have the sulphur at the end. I put the wire into the cylinder, and now you see it burning. It is not often one sees iron burning. We might in this way cause a number of substances that do not ordinarily burn in air to burn in oxygen. Oxygen exhibits the properties of air, but in a higher degree. Air, however, is not pure oxygen, and although air possesses these properties the oxygen in the air is diluted with another gas. When oxygen is taken from the air we have left another gas, and that gas is called nitrogen. Now, as I have shown you the properties of oxygen, so I will show you the properties of nitrogen. Nitrogen has singularly negative properties. It will not

burn, and, while one can breathe it, it does not support respiration. It is simply a diluent.

Now, let us turn to the previous experiment which has been going on. You see the water in the bell-jar has risen above the level of the water in the dish. That water is going up to take the place of the oxygen removed from the glass vessel by the burning phosphorus. In other words, we learn that air consists mainly of two gases—one oxygen, the other nitrogen; that air is made up about one-fifth part oxygen and four-fifths nitrogen. Air consists of these two gases mixed in this proportion—roughly, one to four, or, more accurately, 21 per cent. of oxygen and 79 per cent. of nitrogen. If I take an ordinary wax taper, burning freely, and plunge it into nitrogen as I do now (experiment performed) it is extinguished, showing that while oxygen will freely support combustion, nitrogen will not support combustion at all. If I lift up the cylinder containing the nitrogen and allow air to pass through it the taper will then burn in it. To repeat that experiment in regard to the ability of nitrogen to support life it would be necessary to get someone upon whom to experiment until they ceased to breathe, and the law, as you know, is against that. We all, I suppose, remember the story of the Black Hole of Calcutta, where a number of people were imprisoned in a small room, and where, for want of air, a great number of them died. Now, the cause of death was not so much the want of oxygen as the presence of something else. I said a few moments ago that we could not use a candle for a particular experiment because the candle not only took something out of the air, but put something back instead. That is true of all burning, and it is true also of breathing. While we breathe we take something from the air, and put something back in its place. Let us try to find out what it is. Let me now burn something with which we are very familiar—charcoal. As you know, it is one of the several forms of the substance known as carbon. It is a most important substance. It is in most of our food

substances—in our bread and meat. It is in sugar. Its presence in bread becomes manifest when we toast it or scorch it at the fire—the black stuff is carbon. The same is true of meat when we roast it. I have taken a piece of charcoal as a very common form of carbon. I light a fragment of it and place it in this oxygen. See what happens. We find that the charcoal burns away. I want to test this gas before and after the operation to see what takes place. I have here some lime-water, which is made by pouring water over quicklime and letting it stand. I burn this charcoal in the oxygen, and the oxygen combines with the carbon to produce another gas of totally different properties from the oxygen. This gas is carbon dioxide, or carbonic acid gas. I want to show you what effect this has upon the lime-water. The lime-water, under the action of this gas, becomes quite milky. I now breathe into a cylinder containing lime-water, and the result is that it becomes milky. I pass some air from the room into a second cylinder with lime-water in it. It remains clear. Although there is a small amount of carbonic acid gas in the air of the room it is so small that I would have to pass a great deal of it through the lime-water to make it milky; but the air from my lungs turns this lime-water milky at once. In ordinary air there is, as I have said, 21 per cent. of oxygen and 79 per cent. of nitrogen; but there is also a very small quantity of this carbonic acid gas. We must not regard it as an impurity so long as it is present in normal quantity. It is present in the proportion of .04 per cent., but instead of speaking of .04 per cent. I will speak of 4 volumes in every 10,000 volumes of air. It is constantly being added to from various sources, such as breathing and burning. All living things breathe out carbonic acid gas into the air. One would at first wonder how it is that this gas, which will not support breathing, and will not support combustion, and does not accumulate in the air and cause us all to die. Now, the explanation is a very beautiful one. We find that although plants, like animals, breathe out

carbonic acid gas, this gas is the principal food of green plants, and green plants, under the influence of sunlight, take this carbonic acid gas out of the air, use up the carbon to build up their substance, and give back into the air the oxygen needed by animal life. Anyone may prove that for himself. If you take a sprig of some green plant and put it under water *in the sunlight* you will notice bubbles appear on the leaves. The gas may be collected, and will be found to vigorously support burning. The gas given off by the green plant under the influence of the sunlight is oxygen. This carbonic acid gas is absolutely necessary for plants. At the same time, that does not satisfy us that it is good to have plants in bedrooms, because, as I have said, it is only under the influence of sunlight that what I have described happens. I am going now to leave these two constituents of the atmosphere—oxygen and nitrogen—and turn to the carbonic acid gas which should exist in air in the proportion of 4 volumes in 10,000. I am afraid it exists in much higher proportion in this room at present. I hesitate to say in what proportion, but certainly much higher than that. How can we make this carbonic acid gas? Nothing easier. We may make it by pouring water upon limestone and adding some hydrochloric acid (experiment performed), and immediately we notice bubbles of gas arising. It is a very heavy gas, and settles at the bottom of buildings, wells, mines, and such places. This gas will not support burning, and when a burning taper is put into it it goes out instantly. The gas is, as I have said, a very heavy one, and as it sinks to the bottom of a cylinder I can pour it from one cylinder into another.

[The lecturer illustrated this. He had two glass cylinders, one containing carbonic acid gas, the other ordinary air. He proved his assertion by inserting a lighted taper into the one filled with air, the taper continuing to burn; he then inserted the taper in the cylinder containing the carbonic acid gas, and it was immediately extinguished. He then poured the carbonic acid gas

from one cylinder into the other, and repeating the experiment with the lighted taper showed, by the fact that it became extinguished, that the transference of the carbonic acid gas had taken place.]

Well, now, continued the lecturer, one might multiply these experiments to any extent to show that this gas is heavy, and that it will not support burning, and that it is produced in large quantities by the breathing of animals. It is a most interesting gas to study, because it illustrates the intimate relation between the animal world and the vegetable world. It is poisonous to us, while it is food for plants. It is true that human beings may take this gas with impunity into the stomach. In fact, all aerated waters and sparkling wines sparkle because of this carbonic acid gas. Though it is harmless to take it into the stomach, it is dangerous if present in large quantities in the air. It is not so much that carbonic acid gas is poisonous to breathe. It is only poison in a negative sense; if it takes the place of the necessary oxygen we should die from oxygen starvation. As a matter of fact, workmen exist in places where this gas is being used, and though a very high percentage is present in the air, such a percentage as would prove fatal if produced by respiration, no inconvenience is experienced. At every inspiration we take in nitrogen, oxygen, and a little of this gas. At every expiration we send out nitrogen, far less oxygen than we took in, and much larger quantities of carbonic acid gas. That is just the point to remember, that at each inspiration, at each breath drawn in, we take in oxygen from the air and give back carbonic acid gas in place of the oxygen we took in. The amount of carbonic acid gas is being increased at each breath one hundredfold. While the air we take into the lungs contains 4 volumes of carbonic acid gas in every 10,000 volumes the air we breathe back from our lungs contains 400 volumes in every 10,000. Now this carbonic acid gas is accompanied by a certain amount of solid matter. This matter readily putrifies and becomes an additional evil influence in expired air. I said I

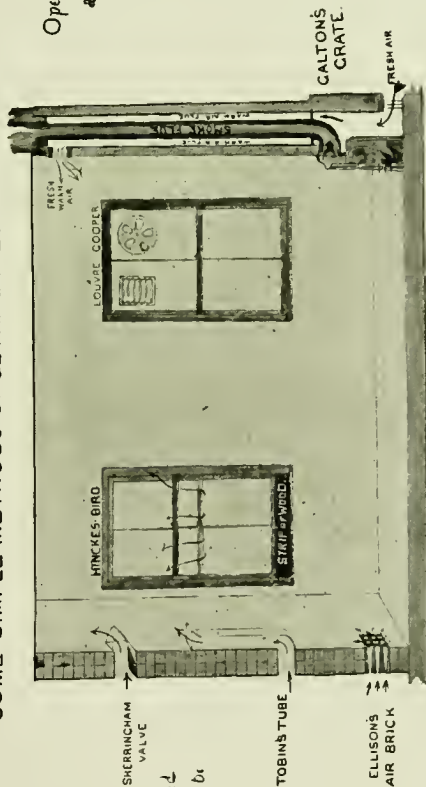
VENTILATION

SOME SIMPLE METHODS OF GETTING FRESH AIR INTO A ROOM

Each person requires
3000 cubic feet
of
Fresh air per hour

Air which has been breathed
is impure and unfit to be
breathed again —

Open Windows are good
and simple means
of
Ventilation





would tell you what the air is. I hope I have succeeded in making that clear. It is a mixture of gases. In addition to these gases there is water vapour and a number of impurities. It was my fortune to deliver a lecture here about a fortnight ago dealing with these impurities, and to speak of dust in relation to disease, therefore, I need not deal with that aspect of the question now.

I shall now attempt to show you what we do to the air and what it does to us. I have shown you that we greatly increase the quantity of carbonic acid gas in any space, and that that would go on increasing in the air until it became intolerable but for plant life. What is the explanation of the fact that we take oxygen out of the air, and put back carbonic acid gas? Now, that is a question I will endeavour to answer by means of the lantern slides. But perhaps I may supplement what I have said by a very simple experiment. Fresh air is splendid. Air breathed is bad. How can we get rid of the breathed air, and readily get fresh supplies of fresh air? The whole question of ventilation is a very important one, and one worthy of our careful study. Ventilation is based upon two things—the movements of the air and the influence of temperature on the air. What I want now to show you is that air, when heated, expands, becomes lighter, and rises. We can always produce movements in the air by varying its temperature. These are brought about by a number of circumstances. Every wind that blows, every storm, is really due to differences of temperature in the air.

[The lecturer here performed an experiment showing that air, when heated, expands, and that the outer or cooler air rushed in to take its place. He took two ordinary lamp chimneys and placed them in openings at opposite ends of an air-tight box. In one he placed a lighted candle. The result of that, he explained, was that the heated air expanded and passed off out of the chimney, while the cooler air rushed down the other one to take its place. This experiment, he explained, had an important bearing on the question of ventilation.]

Mr. Fletcher continued: What does air do to us? What are its functions in regard to the body? How may we best secure fresh air in our buildings and homes? In explaining to you what the air does to us I shall make use of an illustration often used. We may compare the human body with more or less accuracy to a steam engine. It is a living machine, and, as in the case of the steam engine, it requires fuel. You may regard the body as a converter of energy. We take in fuel; we give out ashes—the waste products from the lungs, the skin, and the kidneys—and we generate energy. The bodily temperature is maintained at about 98.4° Fahrenheit in health, and to maintain this, heat is produced by the food we eat and the oxygen we inspire. Now, just as in the case of ordinary burning, where heat is produced, so in the case of the body combustion is going on. Oxygen is being used up in the combustion, and water and carbonic acid gas are being formed as a result of it. The inspired air contains the 21 per cent. of oxygen and 79 of nitrogen. The expired air contains an enormously increased amount of carbonic acid gas. [These facts were illustrated by diagrams thrown upon a screen by the magic lantern. The next slide showed the thoracic cavity containing the heart and lungs, also the diaphragm, surrounded by the ribs and the breast bone protecting the lungs, and lying between them is the heart.] Now, this air-box has great capacity, but it is extraordinary how few people know how to breathe. You are recommended in the pamphlet to which I referred in the beginning to take long breaths, to breathe through the nose. These are two most important injunctions, and are very often forgotten. I remember many years ago reading a book by an author whose name I do not remember, but the name of the book was "Shut your Mouth." It was not a very polite title, but the book was very interesting. It showed what valuable results arose from breathing through the nose, and pointed out that the nose was intended for purposes of breathing. For example, it filters the air. Those present at my



“DUST EXHIBITS,” PREPARED BY DR. HOUSTON, SHOWING HOW THE LIVING GERMS IN DUST GROW AND INCREASE.

These Exhibits are in shallow, glass dishes with glass lids, in which had been placed a little sterilised nutrient gelatine. When the gelatine is exposed to the dusty air by removing the lid for a few seconds some of the dust particles, which are very minute living plants, fall upon the gelatine, and after some hours may be seen to have developed “colonies” on the surface of the gelatine. A plate, for example, exposed to the pure air on Bray Head showed no colonies, while one exposed to the air on a dusty road showed many. A plate exposed to the air of a breakfast room in the early morning showed few colonies, but another one, exposed after the room had been swept, proved that the dirt had been largely removed from the carpet to the air, and that much of it was living. The exhibit made clear that much of this living dust in the air is of vital importance to us, and that it is the cause of fermentation, of putrefaction, and in some cases of disease.

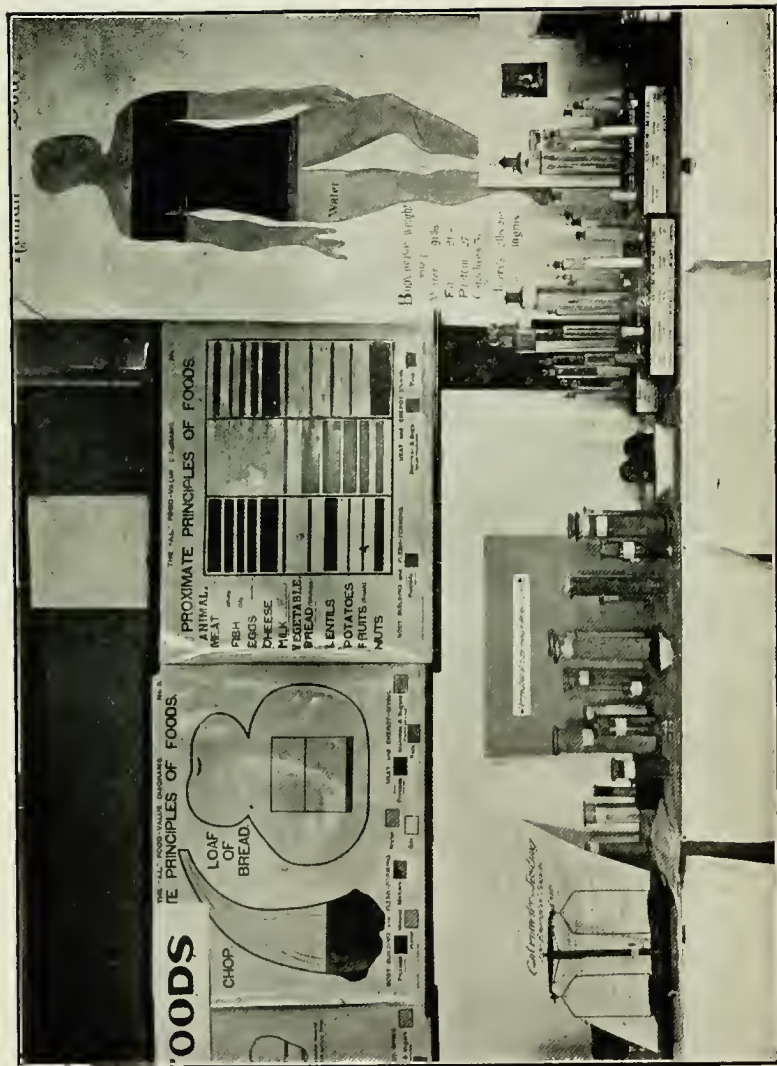
previous lectures are aware that ordinary air breathed inside rooms and outside is crowded with dust to the extent of millions of particles per cubic foot. In every room the air is full of dust. Look at the beam of light (the hall was darkened for the purpose of the magic lantern slides). Its position is marked as it comes through by the dust in the air. Otherwise you would not see it at all. You may see particles floating any day in the sunbeams. Light requires matter in order to manifest itself. Remember that this dust is present in the air we breathe! Remember also that this dust would be extremely injurious if taken into the lungs! Remember also that the path from the lips to the lungs is much shorter than the path from the nostrils to the lungs. Add to these facts the fact that you have a soft, moist surface over which the air passes when entering by the nose, and you will see that the nose forms an admirable filter for dust. It also performs the very useful duty of warming the air before it passes into the lungs. Well, the gentleman who wrote that book, "Shut your Mouth," was so impressed with the truth of this that he says that people who breathe through the mouth run great risks, not only of becoming sick, but of becoming insane! That warning will, I am sure, teach us to make a rule, even now, never to breathe through the mouth any more, but always to breathe through the nose. Well, now, the air as it passes through the wind-pipe divides into two parts—one half going to one lung, and the other half to the other lung. The trachea divides into two bronchi, one for each lung. Someone compared the lungs to a sponge. They are really a collection of air cells. Now, the blood that flows through the body is brought into most intimate relationship with those air cells. It comes through minute blood vessels called capillaries. The blood is only separated from the air by two exceedingly thin membranes which are practically one—the walls of the air cells and the walls of the blood vessels. The blood, consequently, is brought into very close relationship with the air—in fact, so close that the

air can pass from the lungs into the blood, and from the blood into the lungs, and that exchange is constantly taking place—the exchange between carbonic acid gas in blood and oxygen in the air. Oxygen passes from the air into the blood; carbonic acid gas passes from the blood into the air. Now, with regard to the circulation of the blood (diagram shown on the screen) the point is this—the blood leaves the left side of the heart by the great vessel the aorta, and circulates through the body, and ultimately finds its way back by the veins to the right auricle. There is a great difference in the blood passing out of the heart and that passing back again. Passing out it is of a bright scarlet colour, for it contains a good deal of oxygen, coming back it is purple, and contains little oxygen and much carbonic acid gas. The blood comes back into the heart much needing oxygen. It is loaded with products taken from the muscles and other parts of the body, and it takes all these in solution back to the heart. What for? To be got rid of; and the blood, before it can get round to the general portions of the body, must come through the vessels of the lungs, and here it undergoes a change—gets more oxygen and loses its carbonic acid gas. The lungs are the means of bringing the blood into contact with the air, in order to get the oxygen so necessary for the body, and in order to get rid of the carbonic acid gas. Now, just a word as to how the oxygen comes to be carried round the body. The red corpuscles, or red cells of the blood, contain a substance called hæmoglobin. It is this substance that seizes the oxygen, and these red cells act as oxygen carriers for the body. I will now say a word or two as to how we may secure ventilation. I take it you agree that breathing spoils the air; it removes oxygen and replaces it by carbonic acid gas; that while oxygen is necessary to life, carbonic acid gas is injurious and should be got rid of. Our problem, therefore, is how best to effect a change of air. If we closed up the ventilators in this hall it would become unbearable. To me this hall has not been unpleasant. I was afraid it would become so, but it has not. Perhaps that is accounted for by the

toleration we show sometimes to that to which we are exposed for a period. If we were to leave this hall and come back again after a few minutes we should easily realise that it had been occupied; but having occupied it for a time we become more tolerant. How can we get fresh air into rooms? Obviously the best way is to open the doors wide. We do not like that, however, because it brings in the cold air in draughts. People who sleep with the windows or doors open do not suffer from draughts. There is little danger in sleeping with the windows open. A number of simple means lie to our hands for ventilation that we never employ. We allow people to let sewer gas into our houses, we employ plumbers to lay gas into our houses—gases which are positively poisonous if allowed to escape—but we are most careful not to let fresh air in. I suppose the very best kind of ventilation we can have is a fire-place and a chimney, yet I have met many people who, when they do not want a fire, carefully close up the chimney. I am not sure that I have not noticed it in my own house. By this means we get rid of good ventilation. You know that when a fire is burning brightly it is uncomfortable to sit near the door, because of the draught caused by the air rushing in, and you know how readily small light things will fly towards the chimney. The chimney accomplishes a most useful work of ventilation. You have a column of air in the chimney, the fire heats it and it rushes up and out above, leaving the way clear for more air to come in. A chimney, where it exists, is a most valuable help towards ventilation. [The method by which the House of Commons was ventilated was next illustrated by lantern views and explained.] I do not know whether the House of Commons is well ventilated. I have heard it described sometimes as excellent, and sometimes otherwise. I have seen people asleep there, and sleep is sometimes associated with bad ventilation. What we have to deal with particularly is the method of ventilating small rooms. A hall of this kind might be excellently ventilated by having a tube with a gas burner below, which heats the air and causes

it to rush out at the top. A much simpler form of ventilation is that of a hole in the wall, and the great trouble here is to prevent the current of air coming in upon one's head. That may be obviated by directing the air upwards, and this can be done by using Sherringham's valve. The air comes in from outside, and the sheet of metal used directs the current upwards. The difficulty about this valve is that you can close it. Now, I have always noticed that a valve that can be closed remains closed. People may be convinced that fresh air is good, but they will not take the trouble to open the ventilator. We now come to another mode of ventilation known as Tobin's tube, which consists of a tube taken from outside near the ground and carried up inside above people's heads. If the internal capacity is big enough it is a very good form of ventilator. There is another very good form of ventilator—namely, a valve with flap let into the chimney. Many of us, however, must have simpler methods. Elliman's air-bricks—perforated bricks—are a good form of ventilation. By far the simplest system of ventilation, and one most suitable for an ordinary cottage, is to make use of the window—a generous use of the windows, chimney, and doors. It is also well to flush a room when it is not being used, to allow the air to pass through freely for a time. These, and many other ways, are open to us to secure one of the greatest of God's blessings—fresh air; and we may rest assured that it has a most important bearing upon the subject of tuberculosis with which the Women's National Health Association are dealing at present. I am not going to deal with the causes of that disease; but medical men will all agree that one of the best preventatives is to maintain a healthy state of body, to cultivate our powers of resistance to disease, and that these powers are enormously strengthened by the abundant use of fresh air.

A very hearty vote of thanks was moved by Father MacDonald, seconded by Dr. Hillis, Rathmines, and carried unanimously.



FOOD SECTION AT TUBERCULOSIS EXHIBITION,
Under the charge of Prof. W. H. Thompson.

HEALTHY BREATHING AND NATURE'S DEFENCES AGAINST LUNG DISEASE

By PROFESSOR W. H. THOMPSON, M.D., Sc.D.;
King's Professor of Institutes of Medicine, Trinity
College, Dublin.

H. E. THE COUNTESS OF ABERDEEN in the Chair.

It is perhaps superfluous to remind you of the text from which I want to address you to-night—"Healthy Breathing and Nature's Defences against Lung Disease." I want to keep that text before me, and not depart from it if possible. Now, if one were to take a modern house asunder, in the majority of cases it would, as every one knows, be found to be composed of bricks. If you were to take the human body asunder you would also find in it parts corresponding to these bricks—namely, the various organs such as the muscles, brains, lungs, and other parts. It would perhaps be frivolous to speak of some of these as breeze bricks; but there is a certain amount of truth in that analogy. If you go further, and analyse the various bricks of the body, you will find that each is formed of microscopic bricks, which are known as cells. The term originally arose from the supposition that they were hollow—an idea which proved to be erroneous.

If we now inquire what is the use of breathing, we shall find it is for the purpose of supplying air to all these particles of the body, to all these cells; and

if we still further inquire what use these cells make of the atmospheric air the answer can be found on this blackboard. I have here placed in one column the composition of atmospheric air as it is breathed in, and also as it is breathed out. In round numbers every 100 parts of air before breathing in are composed of oxygen 21 parts, nitrogen 79 parts, and carbon dioxide a trace. As it is breathed out the composition is:—Oxygen 16 parts, nitrogen 79 parts, and carbon dioxide 3 to 5 parts. Thus we learn from that table that the microscopic particles of the body deprive the air of part of its oxygen. Hence it is necessary to have a constant renewal of atmospheric air, and the first problem to be met in supplying a suitable breathing apparatus is to provide the mechanical means for filling and emptying the lungs where this oxygen is abstracted from the air. This is accomplished by a very simple mechanism, which I can illustrate to you as follows:—Here is an ordinary bellows. I open and close it; in the opening air is drawn in, and in the closing air is driven out. Much the same occurs, as you shall see presently, in the case of breathing. The chest corresponds to the bellows. When it is opened or expanded in breathing air passes into the lungs, and when closed air passes out. The mechanism in the case of the chest is in one respect slightly different from the mechanism of the bellows, but the principle is the same. I have here a model which illustrates, at all events roughly, the mechanism employed in filling the lungs. In this bell-shaped glass there are two small india-rubber bags, tied at the ends of a Y-shaped tube, which passes up through an india-rubber stopper in the neck. The bottom, or mouth of the glass, is covered by an india-rubber membrane, which can be drawn up or down. In the actual conditions in human respiration the floor of the chest is movable as well as the sides, and the movements of this floor play an important part in the expansion of the lungs. I now carry out such a movement with the floor of this model. I draw it down, and you see that the

india-rubber bags inside the glass case are inflated. [Here the lecturer gave an illustration of the process.] I push up the floor and the india-rubber bags collapse. At the same time a current of air passes in and out of the tube. Such, then, is the mechanism by which the lungs are inflated and emptied in breathing.

The air having been got into the lungs, the next problem is its distribution throughout the body, so as to reach of all the microscopic bricks or cells. There are two ways by which this might be accomplished. The air might be driven as a free gas through a series of small branching tubes into every part of the body. In some lower animals such mechanism does exist, but in large animals it would require enormous force, and entail a great waste of mechanical energy. It would, in fact, be practically impossible to drive the air in this way throughout the whole human body so as to reach all of the microscopic particles. Another mechanism has, therefore, been adopted for the purpose. The oxygen taken from the air is not distributed to the body particles in the simple gaseous form. It is conveyed to them as gas retained or dissolved in a liquid. The liquid in the human body is the blood. Some of you may ask how can gas be dissolved in a liquid. I think I shall be able to show you. I have here a bottle of soda water. You see it is perfectly clear, and shows no signs of containing air or gas; nevertheless, as you all know, when I open the bottle and remove the pressure large quantities of gas bubble out of the soda water, producing a foam at the mouth of the bottle. A similar result occurs when atmospheric pressure is removed from the blood, gas streams out and makes a foam on the top. I have here a stout vessel exhausted of air; the interior is a vacuum. Dipping through the cork is a tap funnel containing a little ox blood obtained from the butcher. I shall presently open the tap and let the blood run into the vacuum in the vessel where the atmospheric pressure will be removed from it, and you shall see it burbling up into a foam from the bubbling out of gas. [An illustration

was here given.] You see, then, that in blood, as in soda water, there is gas, which bubbles out when pressure is removed or diminished. The amount of gas which can be dissolved at ordinary pressure in a liquid in this way is comparatively small, and would not suffice for the wants of the human body. But there is an additional way in which gas can be contained or held in liquid. The gas can combine, preferably in a loose way, with some chemical ingredient of the liquid, which would thus greatly add to the power of the liquid for holding and distributing the gas. As a matter of fact, this principle is adopted by nature in the case of animal and human blood. A constituent of the blood—its red colouring matter, in fact—holds large quantities of oxygen loosely united with it. This blood is sent all over the body, into every cranny and chink, where it comes into contact with the microscopic particles, and these detach the oxygen from the blood pigment according to their needs.

We have now to inquire what use the microscopic cells of the body make of the oxygen when they get it. Well, there is a curious similarity between what goes on in these little particles—every one of them living—and that which occurs in an ordinary fire when it burns. In the fire the carbon of the coal unites with the oxygen of the air, producing heat, and forming a poisonous gas—carbon dioxide—which escapes up the chimney. In the body precisely the same process goes on. Oxygen carried to the ultimate particles is there united with carbon, provided by the food, and with the same results—formation of heat and production of a harmful gas—carbon dioxide—which has to be got rid of. For this purpose the blood is again used to transport the harmful gas back to the lungs, where it escapes with the air breathed out. If you look at this table you find that in the air which comes out of the lungs there is a substitution of carbon dioxide for the oxygen removed from the air breathed in. The air we exhale contains this harmful gas, the injurious effects of which have to be

counteracted by free ventilation. I can show you this by means of an experiment. Here is a bell-jar dipped into a basin partially filled with water. I have inserted into the neck of the jar a cork fitted with an india-rubber tube and mouthpiece. I now breathe in and out of the jar. As I breathe in the water rises up, and as I breathe out it returns to its original level. By holding the nostrils so as to admit of no inlet of fresh air, the same air can be breathed in and out two or three times, and when that is done the air becomes so impure that it will not keep a candle alight. And if it does not support the flame of a candle you may be sure it could not support human life or life in any form. On applying this test you see the candle goes out, and by no power that I am capable of, under these conditions, can I get this candle in and keep it alight in the bell-jar. Now, to show you that there is really nothing in this jar to prevent the candle keeping alight beyond what I have breathed into it, I ventilate it for a moment, replace it in a glass trough, and bring the candle into it again, and, as you see, the candle keeps alight and burns cheerfully.

We have now learned certain initial facts about healthy breathing. In a general way we have learned of the principles by which lungs are inflated, how the oxygen is removed from the air and distributed by the blood throughout the body. We have learned also that the oxygen is used up in the body cells and combined to form a harmful gas, which, when returned to the air, has to be freely diluted or got rid of to make that air wholesome. I have yet to show you how these processes are actually carried out in the human subject, and to make the subject clear I shall make use of lantern slides. The first slide is a skeleton of the chest, in which you see the bony cage, movable, and capable of being enlarged and diminished in size. Inside of the bony cage we find here [next slide] the lungs on each side and the heart between. In this [third slide] we see a view of the lungs uncovered by the ribs; the left lung

with its two lobes, and the right lung with its three lobes—the former largely concealing the heart from view. And now we come to the finer structure of the lungs; each is joined on to the windpipe (which begins above at the larynx) by means of a bronchial tube. If you follow these tubes into the lungs you find that they branch freely, dividing and sub-dividing most minutely, till we have a series of the finest passages leading to the utmost recesses of the lungs. Every particle of the lungs is perforated with these tubes. One which you here notice ends in a number of dilated sacs, known as air sacs, where the essential process of breathing or respiration occurs. Our next slide shows you an enlarged view of the structure of these little air sacs, which find room for themselves in every chink. These sacs have very remarkable walls, in which we find networks of blood vessels, very richly distributed. Our next slide shows the dome-shaped floor of the chest. The central part of this floor is whitish, and formed of membrane. The edges are formed of muscle. When the fibres constituting these sides contract, the dome is drawn down, and the chest thus enlarged in its vertical diameter. This occurs when we take in a breath, while the dome returns to its original position when we breathe out. One can see by the use of the Röntgen rays that such an alteration in the floor of the chest actually occurs in the human body. The shaded part here [next slide] represents the heart, and the light part the lungs, with the position of the ribs indicated. This dotted line here shows the level of the floor of the chest when one breathes out forcibly, and this represents its level when one inhales as deep a breath as possible. The difference between the two levels is an index of the capacity for enlargement of the chest; and the factors which permit of a good filling are of the utmost importance to health. Let us see what they are. First of all, a well-shaped chest, and we may learn later some of the causes which prevent the development of a well-shaped chest. Secondly, an erect attitude. If you remember the curve

of the backbone on which the ribs are hinged, and if you reflect that straightening out that backbone would have the effect of spreading out the ribs, you will see that the erect attitude gives the best chance for a good filling of the lungs. Another important factor is muscular development. The ribs are raised up, and the floor drawn down, by muscles. Consequently, it is of the greatest importance to have good muscular development. Without it the chest is not well filled. Moreover, these things reciprocally affect each other, so that if the chest is not well filled the muscles cannot be well developed. But it is essential, beyond and above everything else, to have a good supply of fresh air.

Now we come to the mechanism of transport and distribution of the oxygen gas absorbed into the blood from the air of the lungs. Our first slide in this series represents a lobule of the lung. At the top is a bronchial tube, from which air sacs open along its course. There, also, on one side, is a branch of the blood vessel which carries blood to the lungs, and on the other side a similar branch, which carries blood away from the lungs. If you follow the course of the blood going to the lungs you find that it passes into networks of minute channels that come into association with all the air sacs before it is sent on to the returning blood-vessel. The blood reaching the air sacs is poor in oxygen, and charged with the harmful gas—carbon dioxide. But from the air in the sacs the blood re-charges itself with oxygen, giving up in exchange a quantity of carbon dioxide. In consequence, the blood returning from the lungs is purified, of a bright red colour, charged with oxygen, and freed from excess of carbon dioxide. The thinnest possible walls are placed between the blood and the air in the lungs, so that there is no difficulty in effecting the gaseous exchange. The transport of the purified blood from the lungs is shown in our next slide, in which we have a representation of the heart with a lung on each side. Into the right side of the heart is poured the

impure dark blood, which has been robbed of its oxygen by the cells all over the body. From this it is pumped along wide channels to the lungs on each side for purification, after which it returns along other wide tubes to the left side of the heart. From here the pure blood is pumped all over the body to its microscopic particles. The details of this distribution are shown in our next slide, which also shows the channels by which the impure blood is returned again to the right side of the heart for re-purification. It is important, of course, to good health to have a free circulation of nourishing, bright red blood fully charged with oxygen. This is secured by exercise in the open air, by having healthy blood, and by good nourishing food. These are the factors which contribute to a healthy distribution of oxygen, so necessary for vitality, and vitality is best promoted by keeping the machine going, by keeping it in activity. Keep the muscles active, use every organ, keep the brain, lungs, and heart active. These are all important in securing healthy bodies. It does not do to let our organs "rust." They do their work better for being employed without excessive strain or fatigue. In addition, wholesome nourishment must be provided by the digestive organs, so you see how all the bodily functions interact upon one another. The breathing cannot suffer without the muscles suffering, the muscles cannot lie idle without injurious consequences to themselves and to the circulation, while the digestive organs cannot suffer without the whole body suffering. A point to bear in mind, however, is that the organs must not be over-stimulated to activity. It does not matter what may be the stimulant, whether alcohol, or tobacco, or tea in excess, the effect is harmful.

I now want to call your attention to "Nature's Defence against Lung Disease." We shall see that there are several lines of defence in the mechanism of breathing. The first line is furnished by the passage of air through the chambers of the nose. Here it enters through a series of complicated passages and clefts

where it is warmed, moistened, and filtered free from many of the harmful particles that may be contained in it. These passages are shown in our next slide, as well as the channel through which air goes if we breathe through the mouth. The following slide shows the shape of the chest, which results from obstruction of the nostrils by adenoids. The supply of air is inadequate. The chest is flat, the shoulders round, with the shoulder blades prominent or winged. Passage of air through the nose also ensures a warning where necessary, in the shape of a sneeze, which causes an explosive expulsion of irritating particles if they be present in the air. The next safeguard is provided in the formation of the larynx, where the air enters the windpipe through a narrow chink. Irritation of the sensitive membranes covering the side of this chink give rise to a cough, which is another form of explosive expulsion adopted by nature. A further safeguard is found in the long, narrow air tubes coated with a membrane covered by adhesive material, which arrests particles of dust or microbes, as the case may be. But these particles are not allowed to remain, and effect a lodgment where they have been caught. Beneath the adhesive covering of mucus is a layer of tiny waving filaments constantly in motion, which work the particle up till it gets to the larynx, and then comes a cough to expel it. Still another provision belonging to the first line of defence is seen in our next slide. This black streak in the coat of the bronchial tube consists of a ring of muscle which is there for the purpose of narrowing the tube, and so acting as a safeguard to obstruct the passage to the air sacs beyond in cases of danger. The provisions embraced in this first line of defence are so perfect that, under normal conditions, no microbes are found in the bronchial tubes.

The second line of defence is formed by certain colourless or white particles which are present in the blood. They are of various kinds, and some of them have the power of altering their shapes and taking

particles of matter inside them. They are thus enabled to flow around and engulf microbes. Now, if the microbes penetrate the covering of the bronchial tubes, and lodge in the lungs or any other part containing blood vesels, these white particles leave the blood channels and advance to meet the enemy, which they surround and enclose, ultimately killing, swallowing, and digesting it, if it be a living microbe. We see here an enlarged view of one of these particles in the process of swallowing a microbe longer than itself, which it finally digests. When this function of these white blood particles was first discovered it seemed so like a fairy tale that few people really believed it, and investigations were undertaken to ascertain if anything analogous occurred elsewhere in nature. If one could find such in the lower forms of life, and trace it to the higher, this would be a strong confirmation of the view. As a matter of fact, this was found. Here is represented a little animal which consists of two layers of cells with a space between containing semi-liquid material. In this space we see a particle of glass that has penetrated the outer coat of that animal, and what has happened? Little wandering cells from the inside surround that particle, unite together, and wall it in. They would also eat it had it been eatable. What takes place in the case of this microscopic animal is confirmed in every stage up through the animal kingdom, till we come to man. The process has its type in all classes of animals. But the killing and eating of microbes is only part of the second line of defence. Some of these invaders are apparently not very palatable. Some, probably all of them, produce poisonous material, which, in addition to the destruction of the microbe itself, has to be neutralised. For these purposes substances of a chemical nature are formed in the body, some to neutralise the poisons or "*toxins*," and consequently called anti-toxins, some to make the microbes more palatable to the white blood particles. These latter are called "*opsonins*," from a Greek word

which signifies to prepare a feast. They were first discovered by our countryman, Sir Almroth Wright. Some of these anti-toxins and opsonins remain in the blood after the microbes of an infective disease have been conquered, and make the person immune in many cases to a further attack, at least for a long time. How these substances are produced is not with certainty known, but they are believed to be formed by the cells of the body in general, and particularly by the blood particles. Moreover, some microbes are more resisted by the omnivorous blood particles than others—that is, they excite more vigorous attack than others. In this respect the tubercle bacillus seems to be a very stealthy one, and to be able to creep in without attracting much notice at first. Blood particles which have the power of engulfing bacteria are called phagocytes, or cell-eaters, for the bacteria themselves are unicellular living things—vegetables, in fact. The following slides show the application of these processes to the lung. The first shows tubercle bacilli walled in by a large cell formed by the fusion of phagocytes. Around this are layers of smaller cells. The whole constitutes what was long ago called a tubercle, and from which the name tuberculosis has been derived. Next we come to a further step in the same defence. The micro-organisms and cells in the interior of the tubercle are being starved, the blood which is necessary to keep all the cells in the body alive is gradually being reduced, and in consequence the interior degenerates. And now we see a further stage in which the organisms have been successfully killed, and the healing process is taking place. The ravages made by these micro-organisms are undergoing repair. To sum up the second line of defence it is this:—The white blood particles, or phagocytes, as they are called, pass out of the blood vessels and surround the enemy. They wall him in and paralyse his forces by anti-toxins, which neutralise the poisonous material he produces. They starve him out, cook him, and ultimately eat him. Finally, other particles set

about and repair the ravages. We may talk about dum-dum bullets, lyddite shells, and cannibalism; well, we have all combined in this defence of nature. Barbarous methods, if you like, are certainly applied here, and, up to the present, microscopical examination has not revealed any trace of a peace conference intervening between these warning forces. It is war to extermination on both sides. But we can do a great deal to assist in conquering the enemy by promoting general health and attending to the hygienic conditions of the body.

The third line of defence is part of a general system of protection found throughout the whole body. Everywhere in it we have not merely blood channels distributing blood for the use of the cells, but we have also a set of lymph channels, of which a representation is shown in our next slide as they occur in the finger. Now, suppose a microbe escapes the first line of defence, or cuticle of the finger, and the second or white blood particles, the next line of defence has to be fallen back upon. The poison or microbe advances along a lymph space which converges towards a lymph gland, or nodule, through which the material filters, and where it is arrested. The first of these lymph glands in the arm is at the elbow. It is well known that when one gets blood-poisoning in the finger there is a tender little swelling, just above the elbow on the inner side of the arm, which is the lymph gland in question. Our next slide represents one of these nodes in section, and shows the channel of entry and the channel of exit. The channel of entry passes into a space filled with myriads of very minute cells resembling white blood particles. Indeed, some of the white blood particles are derived from these, and resemble them. They remain as it were in barracks waiting to intercept any harmful material that comes along. It is possible, of course, that the charge may be so great that the first lymph node may not be able to stop it, but, stage by stage, there are others found which help to arrest the poisonous material. Numbers of these nodes are also found in the neck, and

we shall find that in the lungs and in the chest there are numbers also. Likewise, there is a system of such channels coming from food passages. All converge to a great big channel which runs up along the spine through the chest. This, then, is the third line of defence which nature adopts. The harmful material that evades or escapes the walling-in process of the phagocytes creeps along the lymph spaces, which lead it to the lymph glands, and there it has to run the gauntlet of myriads of cells lurking in narrow passages, and constantly keeping up war against it. In successful cases its progress is stopped; but, notwithstanding all these defences, it is possible, as we know every day, that the microbe may gain hold over the body, and while the defences are, in normal conditions, very ample indeed, still, when from some untoward circumstances the vitality is lowered, perhaps after such a disease as influenza, or as a result of chronic underfeeding, the resistance of the body is weakened, and the microbes effect an entry. Under such circumstances what we can do is to come to the aid of the body and support it by every means we know how to devise, so as to enable it successfully to overcome the enemy.

In conclusion I should like to show you a few slides illustrating commonest modes of successful attack by the tubercle bacillus—if we may unfortunately use the expression. The first is by way of the bronchial tubes, effecting a lodgment near the entry to the air vesicles or cells. The next mode is by penetration of the bronchial mucous membrane, and lodgment in the bronchial gland. These lymph glands wage war against the bacteria, and, perhaps, resist its progress for years and years, until after some unfortunate lowering of the vitality the defence is insufficient or broken through, and the organism is then taken into the blood vessels and gets to the lungs, or it may also get up to the base of the brain. The third mode of entry is a comparatively insidious one—through the lining membrane of the mouth, often the tonsils, generally at a time of

inflammation or local damage to the membrane. The microbe enters the glands below the jaw, and is arrested for a time, causing swelling of these glands. Later, if it is successful, other glands of the neck become secondarily affected, and from these the disease may spread to the lungs should nature's defences be overcome. Now we come to the last. The primary lodgment is here in the membrane of the alimentary canal, causing either ulcers, or more frequently penetrating the membrane to be stopped by lymph glands, should the defence of these be unsuccessful. The microbe then gets into the blood, and is carried to the liver, the lungs, and, unfortunately, all over the body.

And now, your Excellency, ladies and gentlemen, I have to apologise for the length of my lecture, and to thank you for your patient and courteous attention.

HER EXCELLENCY THE COUNTESS OF ABERDEEN said: We have all been deeply interested in Professor Thompson's description of the battlefields in which nature fights disease. I know all those here would like to have thanks expressed, and I therefore call upon Mr. Kinnear to express it.

MR. J. A. KINNEAR, in proposing the vote of thanks, said: I came here to-night expecting a treat, but I did not anticipate the great treat we all have had. Avoiding highly technical terms, Professor Thompson brought everything down to the level of everyone in this hall. It was a great privilege to hear such a lecture, and it is to be hoped that its benefit will be realised in a practical manner in many homes, and such a result would be a far greater reward to the lecturer than any words of mine. I am interested in the question of thorough ventilation in every form, and it is, therefore, a pleasure to hear a subject so well ventilated as has been done by Professor Thompson. It was my privilege to go through the Consumptive Hospital in Newcastle, and if anyone present this evening wishes to see it the resident

doctor will be pleased to show him through. In proposing a vote of thanks to the lecturer, I cannot help referring to her Excellency's powerful influence in pushing forward the cause in which we are all interested. She takes as deep an interest in the Irish people as if she was an Irish woman, and her presence here to-night in such inclement weather proves her very great interest in this movement.

MRS. HASLAM seconded the motion, which was carried by acclamation.

PROFESSOR THOMPSON, in reply, said: Your Excellency, ladies and gentlemen, I have to thank you exceedingly for your cordial vote of thanks, which I am afraid is really not half as well deserved as it has been expressed. I am quite sure this campaign—a work which will live on for many years—will come, perhaps, only to full fruition after we have passed away, and after our successors have taken our places. I may, perhaps, add that there are two or three things I specially wished to bring out in my lecture. First, that if you give nature a chance she is very capable of safeguarding us from disease. Second, that if the microbe gains a lodgment nature, even at this stage, is able to overcome, if we assist by supplying favourable conditions. Third, that we cannot have disease in one organ of the body without damage to all the others, and that if we want to heal one diseased member we have to pay attention to the health and life of all.

The proceedings then terminated.

SOME FACTS AND FALLACIES IN REFERENCE TO TUBERCULOSIS

ABSTRACT OF A LECTURE BY SIR CHARLES A.
CAMERON, C.B., M.D.; Professor of Hygiene,
R.C.S.I.; Superintendent Medical Officer of Health
for Dublin.

DR. JOSEPH REDMOND, President R.C.P.I., in the Chair.

AFTER some introductory remarks, the lecturer said that it was sad to reflect on the great mortality caused by tuberculosis in Ireland. It was not in their own country alone that the Irish were prone to contract the terrible disease, for in England, Scotland, and in the Colonies and foreign countries they suffered from the disease more than people of other nationalities, with, perhaps, the exception of the Russians. In a sanatorium in Philadelphia, United States, out of 5,918 patients of 36 different nationalities, the Irish numbered 1,026—an undue proportion considering the number of Irish in the city. In 1905, 937 persons died from lung tuberculosis; this was in the ratio of 3.15 per 1,000 persons living. If all fatal cases of tuberculosis be included the death-rate was 4.71 per 1,000. Deaths caused by the principal infectious diseases, such as typhus, enteric and scarlet fevers, measles, whooping-cough, and diarrhoea maladies, constitute what is termed the zymotic death-rate. In the decade ended in 1888, the zymotic death-rate in the City

of Dublin was 4.2 per 1,000 persons living. In the following ten years the mean annual rate was 2.9 per 1,000, and during the last three years the rate fell to 2, or slightly below the average rate in the great English towns. It is not unreasonable to assume that this great reduction in the zymotic death-rate was largely due to improved public sanitation, as well as to better private hygiene. But whilst the fevers have declined the various forms of tuberculosis show no decrease. It is clear that some measures other than those which have reduced the zymotic death-rate are required to lessen the terrible mortality caused by tuberculosis in its protean forms. Now that a campaign against the "white peril"—and a real peril it is, unlike the so-called "yellow peril"—has been commenced so energetically we may hope that the ravages caused by tuberculosis will be substantially decreased.

It is a popular fallacy that phthisis, or pulmonary consumption, rarely attacks people in middle or old age. At no age is man immune to this disease. There were more cases of tuberculosis amongst young people than old people, but that was because the former were more numerous than the latter. According to the Census of 1901 Dublin had 144,880 persons under twenty years old and 231,392 persons under forty years, leaving only 94,740 over forty years. In the Dublin workhouses, of 6,024 inmates, only 684 were twenty years of age. Yet the deaths due to phthisis were in the ratio of 50 per 1,000 of the inmates. The poor were the greatest victims of tuberculosis. Of the population of Dublin in 1901, 17,436 were classed as "professional and independent." Only 18 deaths from phthisis were registered from this class in 1905, and 6 in 1906. There were 89,861 "hawkers, labourers, porters, &c.," in 1901, and in this class were the lowest classes of the community. Amongst them there were 307 deaths from phthisis. The persons, too, who died from this disease in the workhouse belonged for by far the greater number of the class of hawkers, &c.

There was a fallacy that the average duration of tuberculosis was ten years. He disagreed with that opinion. As there were 937 deaths from consumption in Dublin in 1906 that would probably mean 9,370 consumptives. The Census of 1901 states that there were 180 persons sick from consumption at home or in hospital. No doubt these persons were very ill and unable to work, but they nevertheless must have formed no inconsiderable proportion of persons suffering from phthisis. The entire number of persons returned as sick, excluding idiots and the insane, were in the ratio of 15.5 per 1,000 of the population. Cornet—an authority on phthisis—estimated that there were in Prussia one consumptive in every 128.5 males and one in every 152 females. Applying these figures to Dublin it would show 2,400 consumptives. In Prussia, however, it would seem that consumption runs a shorter course than in Dublin, and probably if it were assumed that Dublin contained 3,000 consumptives the estimate would be near the actual number. It was a very general belief that consumption was an inherited malady, and there were facts that seemed to establish the accuracy of this belief. It was, however, now thoroughly proved that the disease was caused by the introduction of microscopic vegetable organisms into the system. These micro-organisms were ejected from diseased persons by their expectorated matter. They sometimes entered the system through the media of the flesh and milk of animals suffering from tuberculosis. The disease never originated in any other way. That persons with a bad "family history" as regards tuberculosis are more prone to contract the disease is not due to inheriting the virus of the disease from the parents, but unto another cause which the lecturer explained as follows:—

There are in the blood immense numbers of minute organisms whose function it was to digest the food which, in an altered state, entered the blood. As the organisms which cause consumption are composed of the same materials which compose our

food, the digestive organs—termed phagocytes—may or may not be able to digest the disease-giving organisms—tubercle bacilli. The phagocytes may not in the case of certain families be as powerful in attacking the bacilli as the phagocytes in the blood of the members of other families. Recently it has been shown by Sir Almoroth Wright, an Irishman of great celebrity as a pathologist, that the blood contains substances which he terms opsonins, which possess a great power in destroying disease-giving organisms. Deficiency in the opsonins predisposes persons to contract. It is highly probable that the families known to be predisposed to contract tuberculosis have a deficiency of opsonins.

Amongst the measures required to combat tuberculosis is the establishment of sanatoria and hospitals for consumptives—the former for possibly curable cases, the latter for hopeless ones. Difficulty has been experienced in acquiring sites for sanatoria for consumptives, but no danger to persons near them need be apprehended. It has been shown in Philadelphia that in the wards of that large city, where institutions for the treatment of consumption were established, the disease diminished. Many sanatoria have been or are being established in England and Scotland, one—a very large one—known as the King Edward Sanatorium, and to which Mr. Carnegie has contributed no less than £100,000. A Local Government Board Order has been obtained to establish a consumptives' sanatorium for the City of Dublin and the Urban District of Dalkey and the Rural Districts of South and North Dublin, Balrothery Rural District, and No. 2 Celbridge Rural District. It is to be regretted that the Councils of the Urban Districts of Kingstown, Blackrock, Rathmines, and Pembroke have declined to join us in the establishment of this sanatorium. Perhaps they will enter the combination at some future time. The Order enables the combined authorities to strike a rate not exceeding one penny in the pound for the erection and maintenance of the sanatorium.

Another measure was urgently needed, and that was the compulsory notification of consumption. Power for that purpose had already been acquired by local Acts in some English towns. In passing an Act for this purpose, provision should be made to prevent it from in any way giving annoyance or discomfort to the consumptives.

The concluding part of the lecture related to the subject of the sites of dwellings and the means of keeping them from damp and exhalations from the soil. It was illustrated by several experiments. That a relation exists between the soil and disease seemed to the lecturer established by his researches on the incidence of enteric fever in Dublin. There were 50 per cent. more cases of enteric fever in the districts of Dublin where the soil was loose and gravelly and the ground-water twelve to sixteen feet from the surface than in the districts in which the soil was stiff clay and the ground-water six or seven feet from the surface. In the loose soils there was more air in which micro-organisms could flourish, and in which larger amounts of pollution existed. The ascent of ground-damp and foul air from soils was injurious to consumptives and to persons generally. The cleaner the soil under and near dwellings the better. The ascent of damp and foul air from soils was prevented by the thinned layer of asphalt. Formerly the basement rooms had flags, tiles, or wood forming their floors resting upon the bare earth. Now the building bye-laws in Dublin and in many other towns required the site under new dwellings to be completely covered by concrete. He would like to see in addition to the concrete, and as a substitute for a portion of it, a layer of asphalt half an inch, or even a quarter of an inch, thick. A mixture of gas tar and clean sand almost makes an excellent addition to the concrete underlying houses. He had recommended this to be done in the case of houses, accommodating eighty-four families, built in 1892 by the Corporation on an ancient dumping-ground for street sweepings. Although there have been many

cases of enteric fever in the neighbourhood of these dwellings (in Bow Lane), the inmates had always been remarkably free from that disease.

A hearty vote of thanks to Sir Charles Cameron was carried by acclamation on the motion of her Excellency the Countess of Aberdeen.

TUBERCULOSIS OF BONES AND JOINTS

By J. LENTAIGNE, Esq., M.D., President of the
Royal College of Surgeons of Ireland.

H. E. THE COUNTESS OF ABERDEEN in the Chair.

It is just one week since the campaign against tuberculosis in Ireland by the Women's National Health Association was so auspiciously inaugurated by Professor Osler in his opening address. On that occasion, and on many others since, we have had most able and instructive addresses dealing with the tuberculosis problem. Most of these addresses have been devoted entirely or nearly altogether to tuberculosis of the lungs. We must not forget, however, that the tubercle bacillus attacks other parts of the body as well. If we are to attain any real or large measure of success in this campaign we must not neglect these various manifestations of tuberculosis. Fortunately, it is not necessary for me to say very much here in a lecture for the non-professional public on the subject as the general principles for the cure and prevention of the disease are the same for all alike; but to some extent, at any rate, our attention must be devoted to these various forms. Besides invading the lungs, the disease appears sometimes in the bones, sometimes in the joints, sometimes in the lymph glands, on the skin, the kidneys; the membranes of the brain, and elsewhere. These various

manifestations of tuberculosis are extremely common. It is not generally known that they are tubercular infections, and consequently very often no precautions are taken such as might be taken in the more dreaded tuberculosis of the lungs. Ignorance of these matters is almost universal amongst the poor and uneducated, and it is also prevalent to a very large extent amongst the well-to-do and the educated classes. It is an ignorance which is fraught with danger, both to the sufferer and to the community at large. All these tubercular affections are more common in children and young persons, who are undoubtedly more susceptible to the disease than adults. They all have certain characters in common. They generally begin with little or no pain at first, they progress slowly and insidiously, and often it is only after destructive changes have taken place in the part that the patient is brought to the surgeon. I have not time to attempt to describe more than a few of them. I will, therefore, take as an example tubercular disease of the joints. The hip, knee, ankle, shoulder, elbow, and wrist joints are commonly affected, and also the joints of the spine. In all, at first, there may be only a slight and painless, but slowly increasing, swelling, without redness or any external evidence of inflammation; hence the popular name, "white swelling," most often applied to the knee-joint, but sometimes to any of the others, excepting the spine. This stage may vary in duration. Sometimes we see it some months after its commencement; sometimes it lasts a year or more before a surgeon is consulted. If the disease be not cured, sooner or later a further stage is reached—the stage of suppuration. This stage is generally painful, sometimes extremely so, and the patient may suffer dreadfully. Especially is this the case in the later stages of tuberculosis of the hip and knee joints. If, as often happens, the case has not been brought to the surgeon before this, it is always brought to him now, when destructive changes have taken place, and it is a curious thing that the patient and his friends

invariably expect the surgeon to cure him quickly and completely, and to perfectly restore a joint which often has been utterly and hopelessly destroyed by disease before he has ever seen it. Tubercular disease of the hip-joint is a most grave and serious affection. Often its first manifestation is a very puzzling and misleading one for the non-medical person, although perfectly well understood by the surgeon. This is, that the patient complains of pain *in the knee*, and feels nothing whatever wrong, or at any rate does not complain of anything wrong, with the hip itself. This may go on for weeks or months, and sometimes may actually lead to an error of diagnosis in which the knee-joint is thought to be diseased, whilst the hip is really the only part affected. The surgeon, however, by applying certain tests, can always effectually clear up this matter. The bones in the immediate neighbourhood of the joints are often affected by the disease. In children, indeed, it is a common thing for the tubercular focus to begin in the bone, and only by a subsequent extension to involve the joint. When the bones are involved they usually sooner or later become softened and unable to resist pressure; they may even become entirely disintegrated at the affected parts. It is easy to understand how this process will, if unchecked, result in deformity, sometimes extreme and most hideous, always unsightly, and interfering to a greater or lesser extent with the natural function of the parts. This deformity is most noticeable in tuberculosis of the spine, the knee-joint, and the hip-joint. All this time the unfortunate patient is exposed to many dangers. He may suffer an extension of the disease from the bone, joint, lymph gland, or other part affected, to some more vital organ, to the lungs, causing what is known as pulmonary consumption, or even to the membranes of the brain and spinal cord constituting the deadly tubercular cerebro-spinal meningitis. If the patient be not cured, some extension of this sort usually occurs sooner or later, and terminates the life of the sufferer; but it seems really most wonderful when we

reflect how long many individuals may go on—for months and years—carrying a tuberculous focus, with its millions and millions of bacilli, somewhere in their bodies without this dissemination taking place. When the stage of suppuration comes on, and an abscess forms, and makes its way to the surface and opens there, as it so often eventually does, another most grave danger is incurred, and unless measures are taken to prevent it, an invasion of the open sore by other microbes will take place. They will extend to the innermost recesses of the disintegrating joint or abscess, and either by disseminating themselves or by poisonous substances which they generate may rapidly destroy the life of the patient. When they do not actually kill the individual by what is popularly called blood-poisoning they always greatly aggravate the disease and add to its difficulties and dangers.

Now, a few words as to treatment. Here I am glad I can give you a message of hope. Great and manifest as is the improvement in the treatment of tuberculosis of the lungs, to my mind a still greater improvement has taken place in the treatment of these affections that we are discussing now. Formerly, when a man was declared to have tuberculosis of the lungs it was considered that his death-knell had been sounded, and that the end now well in view was only a matter of a short time. In the same way, though not perhaps quite to the same extent, when a patient was declared to be suffering from advanced tuberculosis of a large joint, he was usually considered to be one who was condemned to death, unless the heroic method of amputation was resorted to—a method which, in the old days at any rate, was not invariably satisfactory to the patient. It may be it was this which gave rise to the old saying not yet entirely obsolete—"The operation was most successful." Yes, in removing the limb and the diseased part—"but the patient died." Patients do not die from amputations now-a-days, but still they do not like them, and they prefer, if at all possible, to be cured by other means.

Now, I am glad to say that the improvement in modern surgery renders amputation unnecessary in the great majority of these cases. All the good that amputation really effected was to remove the foci of the disease in a thorough but brutal fashion. Given proper facilities for treatment, and, above all, given the requisite time, we can now, in most cases, remove the foci and clean out the damaged and disintegrated parts, and subsequently effect a cure without amputation. I lay stress on this matter of time. A long time is always a necessity, and until some further great improvement takes place this matter of time will be indispensable. The time cannot, however, be stated exactly beforehand. It may be only several weeks, but it generally takes months, and in advanced diseases of the hip-joint and spine it will probably take a year or more to complete the cure. Although a surgical operation for removing the foci of the disease will greatly hasten recovery, yet for cases seen in the early stages such procedure is very often unnecessary. Suitable treatment without operation will then generally effect a cure, but in such cases a longer time will be required. It is necessary to lay stress on the point that the same general principles which are applicable to the treatment of lung tuberculosis are equally applicable here. In addition to the special surgical treatment which he must have, and cannot do without, the patient must also have good food, pure air, and a healthy house accommodation. I would also expose him to every ray of sunlight that can be got, in this country at any rate. Some years ago a surgeon named Thomas introduced certain splints and appliances for the treatment of these diseases. His results were exceptionally brilliant for the time, and his appliances are still in common use; but it is a significant fact that his and other appliances which have proved successful are all alike in one thing—that they facilitate the getting up out of bed of the patient, and thereby allow him to move about and to breathe pure air, instead of as formerly always remaining in bed in the same spot,

breathing and re-breathing the same more or less tainted atmosphere. By such treatment innumerable cures have and are being effected. I will mention one which should interest and encourage. A few weeks ago, quite by accident, I met a young man whom I did not at first remember, but who of his own accord reminded me that he had been under treatment in the Mater Misericordiæ Hospital twelve years ago for disease of the spine, of the neck glands, and of the arm. I then remembered his case perfectly well. When admitted to the hospital he had been a puny and wretched-looking child, aged seven years, suffering from tubercular disease of the spine in an early, but well-marked, stage, from disease of glands in the neck on the right side, and from tubercular disease of the bone in the right arm a little above the elbow-joint. The treatment consisted of removal of the tuberculous glands and of the focus of tuberculosis in the arm. These operation wounds healed comparatively quickly; but the spine disease was a different matter. It could not be reached by operation. It caused great pain, and there was an unmistakeable angular projection above the middle of the back. This was the beginning of the hideous hump which so often remains as a permanent deformity in these cases, and which, if left untreated, would in all probability have left him a crippled hunchback to-day if he had been fortunate enough to have survived so long. This condition was believed by his friends to have been the result of a fall; and in such cases we are usually told a similar history. The fall or hurt—often a very trifling one—is generally supposed to be responsible for the trouble. I can assure you, however, that in most cases the fall has little, if anything, to do with the matter. The real trouble is damage caused by the tubercle bacillus, and on careful inquiry we can generally elicit the fact that the patient has had the disease for some time before the accident, which only called attention to the condition already present. A spinal jacket was put on this patient, but this did him no good whatever, his pains were nearly

or just as bad ; so, after a month had passed, a new jacket was made with a jury mast to support the head. This was applied, and it at once gave relief. It was worn continuously for two years and a half, when he was apparently cured. That young man is at present sitting amongst you, and he is apparently perfectly free from any trace of disease. The spinal deformity has disappeared completely ; there is now no trace whatever of it, and the only evidence of his old trouble is a large cicatrix on the arm and an almost imperceptible scar on the neck. He remembered, and repeated to me, every detail of his cure, and he also mentioned the significant fact that while he was in the hospital his parents had moved from the old house, in which he had contracted the disease, to another and apparently more healthy one. For this cure he has largely to thank the liberality of the Sisters of Mercy, who have charge of the Mater Misericordiæ Hospital. The authorities of general hospitals do not as a rule like to have cases that take months or years for treatment. Their motto is naturally "The greater good for the greater number," and they prefer cases that can be quickly cured, so that a dozen or more could be accommodated during the time that one case of this kind would be under treatment. It is, therefore, most difficult to get these cases retained in general hospitals as long as they should be, and, consequently, real and permanent cures are far less frequent than they should be. I believe that all these cases can and should be cured. When they are not cured now-a-days what becomes of them ? What becomes of the very poor cases ? If they are under eighteen years of age they cannot be admitted into the Incurable Hospital in Donnybrook, and, therefore, they must inevitably drift into the workhouse infirmaries, where anyhow the ratepayers will have to support them for the rest of their lives. For this reason, and because of structural defects and unsuitability of situation, general hospitals are not suitable for the prolonged treatment of these cases. They spoil the hospital statistics, and are conse-

quently very unwelcome. It is easy for a surgeon, when prescribing treatment for a person well-to-do to bring about a cure if his directions are followed—a prolonged treatment of fresh air and food. The difficulty is in curing the poor. It should be the object of this campaign to effect a change in this respect, so as to supply the poor people, who are unable to obtain for themselves what is necessary for their cure, the means by which they can be cured, and which the rich and well-to-do can always employ. I think, therefore, that it would be well that when sanatoria are being constructed, accommodation should be provided for such cases to complete their cure after a short stay in the general hospital for special surgical treatment. They might be accommodated with the pulmonary cases, but it would be better and safer when cheap wooden buildings or sheds were being erected for the purpose, to have special buildings of a similar character, but with specially trained nurses and some special surgical equipment for these cases. The cost need not be great. It would diminish rapidly after a few years; and anyhow it would be less than the present expenditure year after year without hope of relief of any kind. I could produce many other cases to illustrate this point from the hospital I have mentioned, and I have no doubt but that other surgeons who have equal hospital facilities can easily produce numbers of similar eminently satisfactory cases.

How, now, is this protean and terrible disease produced? You have been told, far better than I can tell you, by Professor McWeeney in his many addresses, by Dr. Birmingham in his able address last Monday, by Dr. Lawson yesterday, and by many others. I need now, therefore, merely repeat that there are three ways:—First, by inhalation with the breath; second, by swallowing with food; and, thirdly, by inoculation. The first way—inhalation by the breath—is generally due to the taking in of particles direct from the breath of diseased persons, or, perhaps, to the impalpable dust that may result from the drying of sputum containing

bacilli. In this connection there is another matter of importance which must not be overlooked. Sufferers from tuberculosis of bones, joints, glands, &c., are not commonly believed to be disseminators of the poison so long as the lungs, or the mouth, or the kidneys are not involved, and this is, I believe, quite true for a while; but when the disease has reached the stage of suppuration, and the abscesses have opened, then I cannot but think that there is danger of dissemination. If the discharges are allowed to dry they may pass into dust, and then are inhaled by the breath. Professor McWeeney tells me that we cannot always easily find tubercle bacilli in the discharges, but they must be there, as inoculation of guinea-pigs with such discharges is almost invariably followed by an attack of tuberculosis in the inoculated animal. Chronic tubercular diseases of this kind may often go on for years, although still discharging they may occasionally become so much better as to be painless or nearly so; and it is really astonishing how careless many people become if they are not suffering pain. How often do we see a filthy rag, stiff with dried matter, wrapped round the limb; sometimes there is no dressing or bandage of any kind, and the discharges are allowed to escape anyhow into the clothing, the bedding, or elsewhere.

The next way is by introduction of the bacillus with food. This may be either due to an infection of the food from particles of infective dust, from dried sputum, or discharges falling into it, or what is probably a much greater danger, from the milk of cows suffering from tuberculosis.

In this connection I would like to tell you the story of an episode which occurred to me. Seventeen years ago, when our knowledge of tuberculosis was vague and unformed, I rented a cottage and farm in the country some seven miles from Dublin with a view to having a healthy place for my young children, who were not at the time looking as strong and as healthy as I could wish. I was particularly anxious to have a pure milk

supply for the children, and as my landlord gave me the option of taking over at a valuation a very fine cow which had been on the farm, and which had been supplying milk for his herd and his herd's family, I felt assured that a satisfactory and pure supply of milk would be available. Pending final arrangements I was to have as much of the milk as I required for my family, and the rest (the quantity was very large) was to be retained by the herd for the use of *his* family. I sent my children out to this cottage, and only on the third day was I able to go out there myself to spend the night. When I got there the herd was about to milk the cow, and I took great pleasure in watching the operation. I was much surprised to see that the first thing he did was to milk one of the cow's spins, so that the first table-spoonful or more fell to the floor of the stable and not into the can. I pointed out to him that he was losing milk, and he said, "I did that on purpose; that is a bad spin, there is a little corruption in it, and I would not let it mix with the milk." I then examined the fluid which had been spilt, and found that it consisted largely of pus evidently coming from an abscess of the udder drained into the spin. On questioning him I ascertained that this had been going on for three or four months. I remarked that none of the milk could be fit for human consumption, but he laughed at me, and protested that it was perfectly good; he and his family had been using it, and it had done them no harm. I then absolutely refused to allow any of the milk to be used by my family, and I warned him not to give any of it to his own children, or, if he did use it, at any rate to have it boiled first. I subsequently ascertained that he entirely disregarded my warning, and went on using it for himself and his children until the cow ran dry and gave no more milk. I myself at once made arrangements for a supply of milk from another source, and, feeling much shaken in my faith as to the purity and safety of country milk, I insisted on having it always boiled before use, much to the disgust of my children, who infinitely preferred

unboiled milk, and could not understand why I made it so nasty for them. Now listen to the sequel. The herd had four children. At this time they were four as healthy-looking children as one could see. About six weeks after this incident the herd's wife brought their eldest daughter, aged about ten, to me suffering from cough and lung trouble. I had her at once admitted to the Mater Misericordiæ Hospital, but she rapidly got worse, and after some weeks was taken home, where she died in a few months of rapid tuberculosis of the lungs. The second boy, aged about six, was brought to me about a fortnight after the little girl. He had well-marked tubercular inflammation of the knee-joint (white swelling). I admitted him also into the Mater Misericordiæ Hospital, and after some time I performed an operation on his knee, with the result that he recovered, and is now perfectly well, except that his knee is stiff and cannot be bent. Very shortly after the little boy had been admitted to hospital the second girl, some years younger than the first, was brought to me with tubercular disease of the hip. She was at once admitted into the hospital. The disease rapidly progressed, and soon abscesses formed around and in the joint; so that here also an operation became necessary. The little boy had just been operated on, and was not yet well, and the parents, who seemed to think I was having too much practice in that quarter, refused point blank to allow me to operate on the girl when I proposed to do so, and they removed her from hospital, saying I had done enough operations on the family. For years afterwards that poor girl was a helpless invalid, wheeled about in a perambulator. When I last saw her hip it was very like the second picture I showed you (slide). She is, I believe, alive still, but she is permanently crippled and deformed by the disease. I have now accounted for three of the children. The fourth child (the eldest, a boy) was also ill at the same time as the others. His illness was obscure. It consisted of attacks of slight fever, with weakness and some wasting and diarrhœa.

Nothing definite could be found, so I treated him at home, and after some months these symptoms passed off, and he got quite well. Now, considering these facts, I had and have no doubt but that the cow was suffering from tubercular disease of the udder, and that her milk infected the herd's family with disease. Very chronic suppurations in animals or men are of a tubercular character, and the tuberculosis that does not involve a vital part like the lungs need not necessarily be fatal. Sometimes it does not even involve very serious discomfort once the abscess is open and is discharging. Of course, it is possible to explain the illness of these children in another way. The two eldest were attending the village school, and may have contracted the disease there; there was plenty of it in and about the village. The little girl who was first found to be ill may have given it to the others by her breath. (They all slept together in a little room in their cottage.) But, on the other hand, she never at any time expectorated anything, and on the whole I feel that all the probability is on the side of infection by the cow's milk—especially as all these children were ill at the same time. Not long afterwards I found out another instance of a family, living not far away, where tubercular disease of the lungs, which had ultimately proved fatal to several of the younger members of the family, was unquestionably preceded by disease of the udder of the cow which supplied milk for the family.

The third way—by inoculation—is rare, and need not be discussed here. It has very little to do with the spread of the disease in Ireland. We can prevent the spread of tuberculosis by inhalation, by segregation of the worst cases, and by the education of everyone. We can prevent it getting into food by the same means, and by putting an end to the sale of infected milk. This can be done if it is made a penal offence for anyone to sell milk from animals that have not been certified free from tuberculosis. Tuberculous cattle will at once become unsaleable, and it will be the interest as well as the duty

of every cattle owner to look after the health of his stock. All tuberculous animals should be slaughtered, and suitable compensation given, for a limited period at any rate, to those who report their cases. If this were done the disease would very soon be stamped out in domestic cattle, and that source of infection would at once be dried up for ever. This campaign must be one of education and of agitation. We must do our utmost to educate the people as regards this scourge. We must show them the harm and destruction it causes, and we must also show how they can cure it, and, above all, how to prevent it. All this can only be done by persistently, in season and out of season, preaching the gospel of health. In this matter we must repeat ourselves until the facts sink into the minds of the people at large and become generally accepted by them, as they are at present generally accepted by the few who are educated. We must also endeavour to teach them to agitate (this ought surely not to be a difficult matter in this country) until those in authority, and who have the power, will give us the means which we demand and have a right to, and by which only can the disease be ended.

In this campaign we have to combat three chief enemies—Economy, Ignorance, and Apathy. The economists must first be dealt with. They are mostly reasonable and sensible people, who naturally object to spend money on schemes of which they do not see the value. These must be convinced by argument and demonstration. I have no fear but that they will be convinced, for the truth must prevail. I believe that ultimately you will find the economists probably your best soldiers in this campaign, giving valuable help and checking the waste and extravagance so natural to enthusiasts. The more dangerous enemies by far are ignorance and apathy. Ignorance we can conquer—it is merely a matter of trouble for us. We must educate the people, and make sure that no one is any longer left unaware of what tuberculosis is and how it is to be prevented. We must educate them by exhibitions, by

demonstrations, and by lectures. Above all, we must ensure education in this matter in the schools. This ought not to be difficult. There are differences of opinion as to what should be taught in the schools. Some men think the classics should be given up; some object to the teaching of music; there are even people who will not have religion taught there; but I do not think there is anyone who will object to a proper health training. All will agree that children should be taught how to keep a healthy mind in a healthy body, so as to be properly equipped to carry on the battle of life. Therefore, we must press for such additions as may be necessary to the teaching in our schools; but we must first teach the teachers themselves, and they in turn will teach their pupils.

I now come to apathy—the worst enemy of all. I can imagine people saying—"Why bother! Why fuss! This is a new fad which will soon pass. Mind your business, and I will mind mine," and so on. To those people the answer is obvious. "*It is your own business*; even now your own children may be absorbing the poison. I will go further. You yourselves may even now be growing the insidious disease in your lungs, in your joints, or bones, or elsewhere; sooner or later to find yourselves locked in the struggle with a cruel enemy, to whom, by your carelessness and apathy, you have given every advantage until perhaps too late." After listening to the Registrar-General's statistics, who can doubt that there are at present in this room several persons who will die of preventable tuberculosis unless something is done to save them? When we have conquered these enemies, when we have convinced the economists, educated the ignorant, and roused the careless from their apathy, there will still be much to be done. We must know where the disease is, and who is suffering from it, so that we may make them realise what they must do to be cured and to be no longer a danger to others. This knowledge alone is not sufficient. We must have the means to apply it. It must be possible to

provide for the poor sufferer from hip, knee, spine, or gland tuberculosis, the prolonged sanatorium hospital accommodation necessary for his cure, and we must be able to ensure that, when he returns to the home where he first contracted the disease, the insanitary conditions which predisposed him to the growth of the poison are no longer present to produce a return. A visit from a medical officer of health, equipped with suitable powers, should be able to effect this. We cannot know where the sufferers are, or who they are, without notification. We cannot hope to cure most of these cases without prolonged sanatorium hospital treatment, and we cannot prevent the disease in others without suitable accommodation for the isolation of the bad cases who are slowly dying of the disease, and without once for all putting an end to infection by milk. Therefore, we must agitate for notification, for hospital accommodation, including the three kinds of sanatoria, and, lastly, for restriction of sale of poisoned milk. When we have gained these things the great battle will be won, but it will not be ended. There will be an immediate cessation in the supply of fresh cases, but the old ones will still remain for a time—varying with the extent of the disease. We can quickly and effectually stamp out tuberculosis in cattle by slaughtering the infected cases, but we cannot stamp out the disease in human beings in the same quick fashion. On the contrary, our teaching will almost certainly prolong the lives of many of those whose disease is too advanced to be completely cured; and as tuberculosis of bones and joints will often go on for many, many years, there will still be something to be done for a considerable time. I am satisfied, however, that in twenty years' time—in 1927—the Registrar-General's figures will show a very different state of mortality from tubercular disease, and that for all time Ireland will owe an everlasting debt of gratitude to the Women's National Health Association of Ireland, and above all to her Excellency the Countess of Aberdeen, who has so graciously started and so nobly helped on this splendid work for the good of our country.

HER EXCELLENCY said: We are deeply⁴ indebted to Surgeon Lentaigue for his lecture to-night. I will call upon Dr. Falkiner to voice our thanks to Dr. Lentaigue? Dr. Falkiner has made a special study of this disease, and in this campaign he has already helped us very much. We are very grateful to him for coming here day after day and giving demonstrations to the visitors coming to the Exhibition, so as to give them in the best form information that they may carry away with them.

DR. FALKINER said: Your Excellency, ladies and gentlemen, in the first place I have to thank your Excellency for asking me to propose a vote of thanks to the Vice-President of the College of Surgeons for reasons that I will explain in a few minutes; and before coming to the explanation of these reasons I wish to express my deep gratitude to your Excellency for the decision which you have taken as regards the suppression of tuberculosis in Ireland. Some twenty years ago, when I first became a poor-law medical officer, I was deeply struck by the existence of that disease in my dispensary district, which is in this city, and at that time I wrote a paper which I brought before the Academy of Medicine, and in which I advocated very much what Dr. Lentaigue has just now put forward—the institution of two sanatoria, one for incurable cases, and the second for those that could be cured. Unfortunately, neither the public nor the professors of medicine at that time were at all prepared to back up the notification and isolation of cases of tuberculosis. Her Excellency has alluded in very kind terms to the small service I may have been able to render here. The people who have passed through the Exhibition have evinced the greatest interest in what was to be seen there, and they were most ready to hear the explanations that were given, and to ask questions about the charts and diagrams and the other features of the Exhibition. A good many of the visitors were from my own county—the County Tipperary. Amongst those who came to the Exhibition was a gentleman who asked

me if he might listen to what I was saying, and I said, "Certainly, sir." This gentleman turned out to be a most attentive listener, and to be one of his Majesty's Privy Councillors in Ireland. I said that I would explain why I thank you for allowing me to propose a vote of thanks to Dr. Lentaigne. I have many reasons to be grateful to him. I am sorry to say that he and I are getting on in life. Dr. Lentaigne has come to the head of his profession, and is now Vice-President of his College. I look back to the time when I was a student in the Richmond Hospital, and when Dr. Lentaigne was house surgeon there. I have known him since we were students. Dr. Lentaigne was a hard worker, and I have seen him get up in the small hours of the morning looking after the poor patients in the hospital, and when I was working in my dispensary, and working hard there, I frequently wanted help, and on many occasions Dr. Lentaigne has come out to see a poor dispensary patient, and to give me the benefit of his cultured medical knowledge. The paper which we have heard to-night is, I believe, a valuable addition to the literature of the subject.

COLONEL BURTCHAEL said: I have great pleasure in seconding the vote of thanks. The thing that struck me about Surgeon Lentaigne's lecture, apart from its very striking nature, was the extraordinary lucidity with which he put all the facts before you. It is a most difficult thing for any professional man, when lecturing on a scientific subject, to put it into such language that ordinary people are able to follow it and maintain their interest in it, and I think that Dr. Lentaigne has done that in a most admirable manner, because I have seldom listened to a more lucid and striking address.

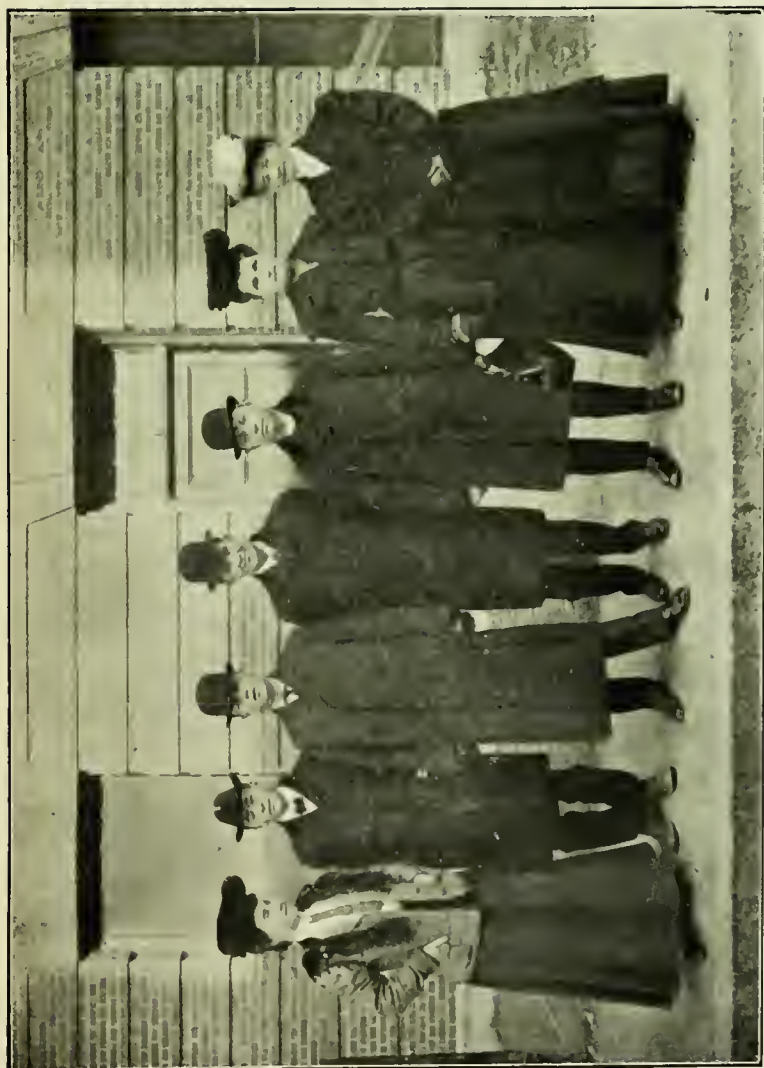
PROFESSOR E. J. McWEENEY, in supporting the vote of thanks, said: Dr. Lentaigne told you how the tubercle bacillus produces these terrible lesions in the bones and joints. It occurred to me as he

was unfolding his story that there was just one little point to which he did not perhaps refer, and that was how exactly it was that the tubercle bacillus came to find its way into particular parts of the human organism—how it was that a certain number of bacilli succeeded in getting into and settling themselves down in these particular places in the bones and joints. Of course, we cannot be absolutely sure how it happens, but the most probable idea—the one which is regarded as most probable by the majority of scientific men to-day—is somewhat on these lines. You have children in what I may call a crawling state—that state in which they crawl about on the floor before they arise and take the erect position which distinguishes man from the lower animals. While crawling about amongst chairs and under tables children are very apt to knock themselves and slightly injure their joints, as, for instance, when the knee-joint comes in contact with the ground, and when the elbow-joint does the same. When these little injuries take place there is a slight effusion of blood as the result of the little walls of the delicate little blood vessels, which are very numerous at this stage, getting broken, and it is then, when these blood vessels become broken in this manner, that the tubercle bacillus settles down in these spots, and, by producing these lesions, brings about these terrible structural changes. Children, too, when scrambling about on the floor, are particularly apt to come across the sputum of tuberculous members of their families. The habit of spitting out on the floor is an exceedingly common practice, and a child crawling about can scarcely avoid getting the tubercle bacilli on to its finger nails for instance. Children at that age have a habit of scratching, and in doing so they produce small lesions in the skin, and in this way the tubercle bacilli which had taken up a place in their nails are introduced into the lesions. A case came under my notice lately of a child who had been crawling about in a tenement room and who had small wounds in different parts of its skin. A microscopic examination was suggested,

and these wounds were found to be covered with tubercle bacilli. This supplies a certain link in the chain which I thought it might be desirable to fill up. I beg once more to add my tribute of praise to the lecture of Dr. Lentaigne, which has given me so much pleasure.

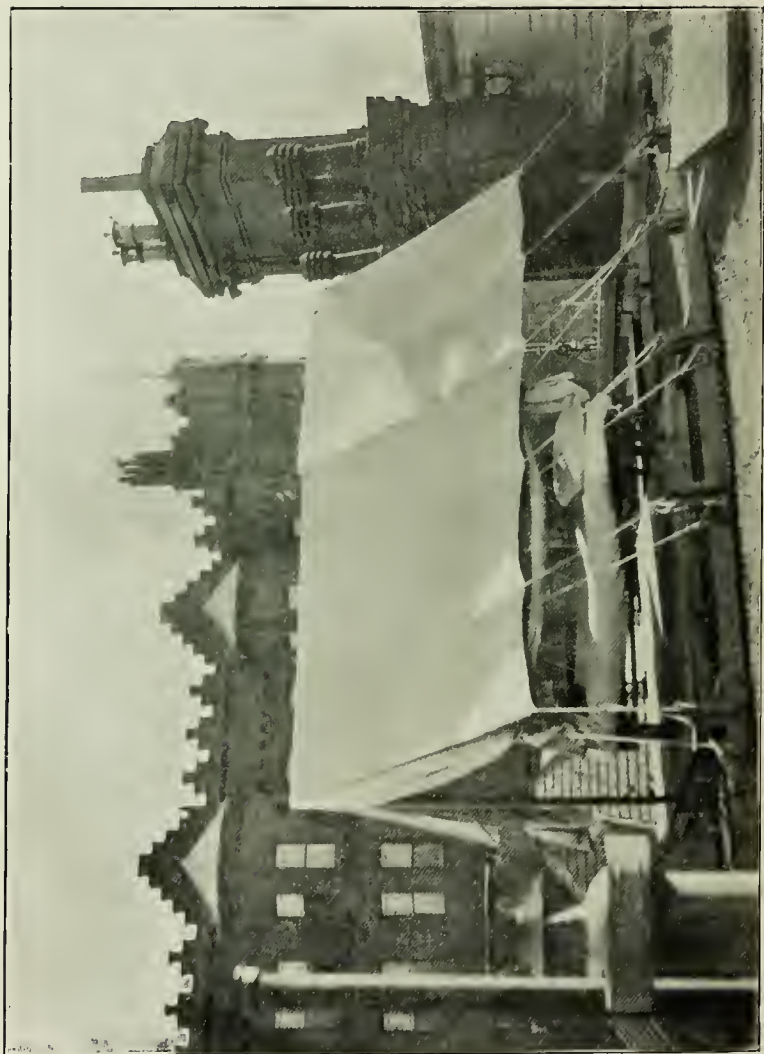
MISS MAGUIRE said: Your Excellency, ladies and gentlemen, I cannot tell you the pleasure which it affords me to add my tribute of thanks to Dr. Lentaigne for his lecture on a subject in which I am deeply interested. I would make an appeal to all the members of the Society who are here to take part in the good work which we hope to effect by erecting sanatoria and other things in Ireland. I would ask them when they are visiting among the poor that they would bear in mind the points which Dr. Lentaigne has brought before us. I belong to a society which has a good deal to do with the poor. In visiting the poor I find many persons suffering from disease, and I find many of them sleeping night after night on feather beds that have done duty for three or four generations without ever having been disinfected, washed, or cleaned in any way. In one case I found a milk pan under a bed where the geese were hatching. These are kinds of things that are very appalling. The floors in these cottages are made of earth which dries very quickly, and when consumptive people expectorate on such a floor it must be full of bacilli. In the West of Ireland I have tried to induce the people to cut small spittoons out of a piece of turf, so that when used it could be burned. I have also instituted a system of premiums for those who burn their feather beds. I would ask those who are visiting the very poor to bear these things in mind, and do what they can to save the people pain and suffering. All who have seen the pictures shown to-night and heard Dr. Lentaigne's very eloquent address will feel that they have a mission in this matter.

The vote of thanks was passed with acclamation.

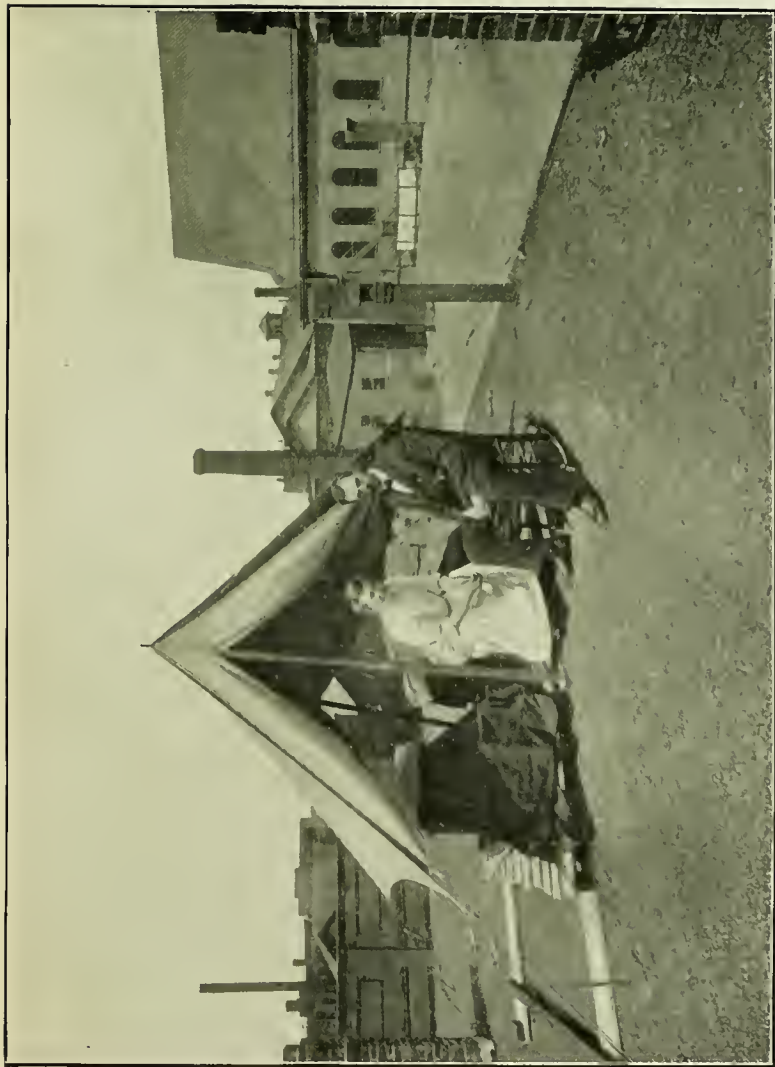


GROUP OF GRADUATES OF EMMANUEL CHURCH TUBERCULOSIS CLASS.

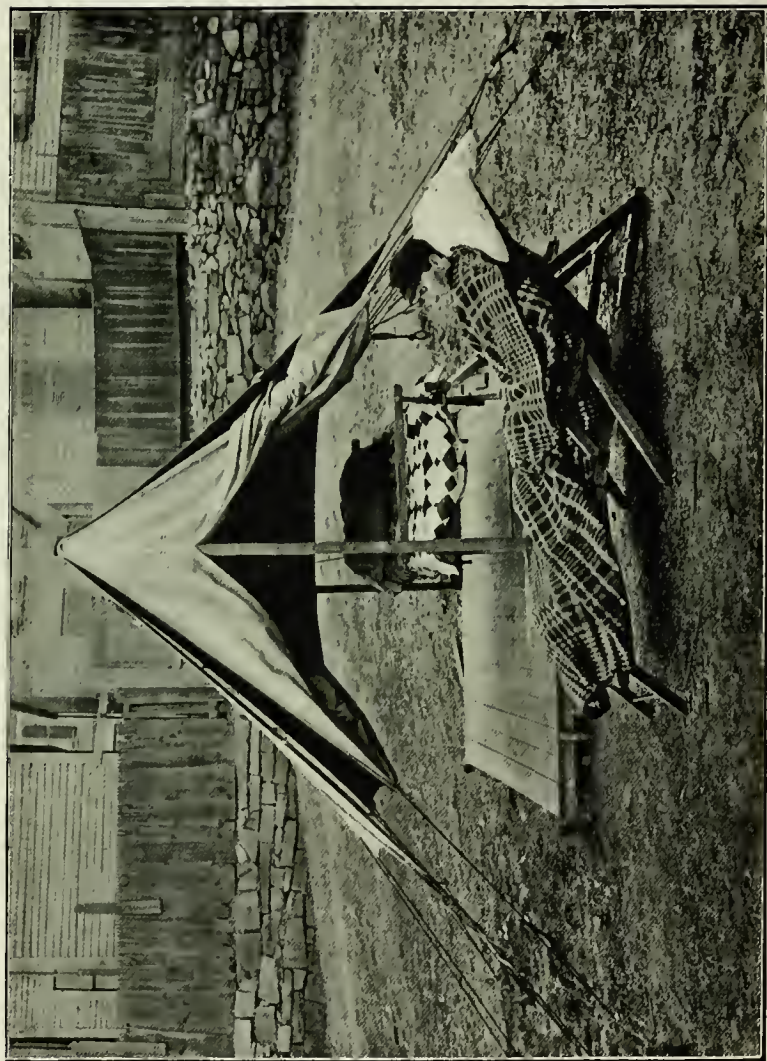
The second man from the left end was the first graduate. He gained 40 lbs. He weighs 3 lbs. more now than he did a year ago, when he returned to work.



A TENT ERECTED ON A FLAT ROOF.

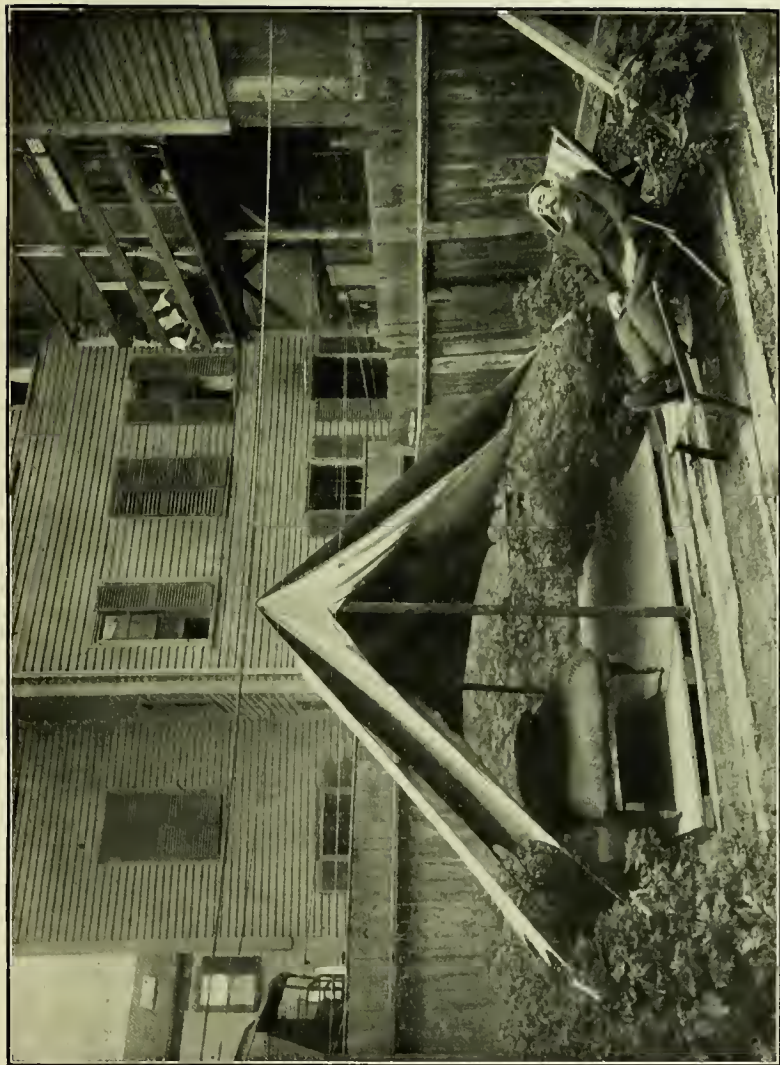


TWO MEMBERS OF THE CLASS, HUSBAND AND WIFE, BOTH AFFECTED WITH PULMONARY TUBERCULOSIS. They have entirely recovered, and are back at work ; the man is now earning more wages than before his illness.

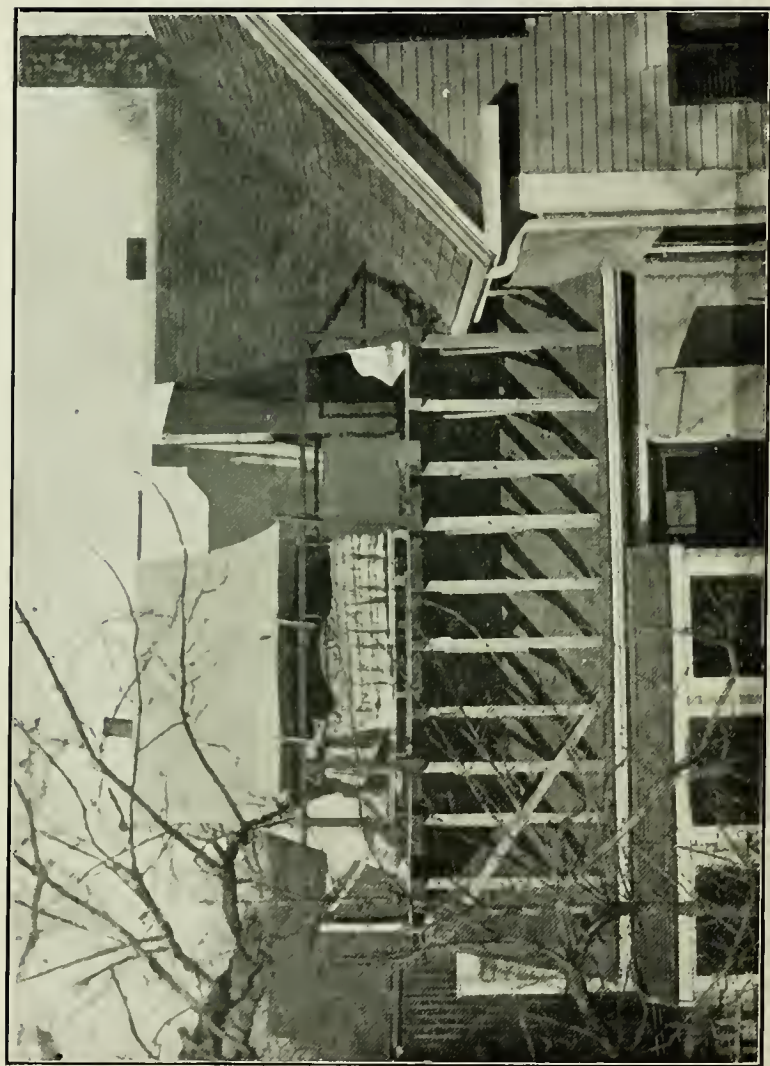


TENT IN YARD.

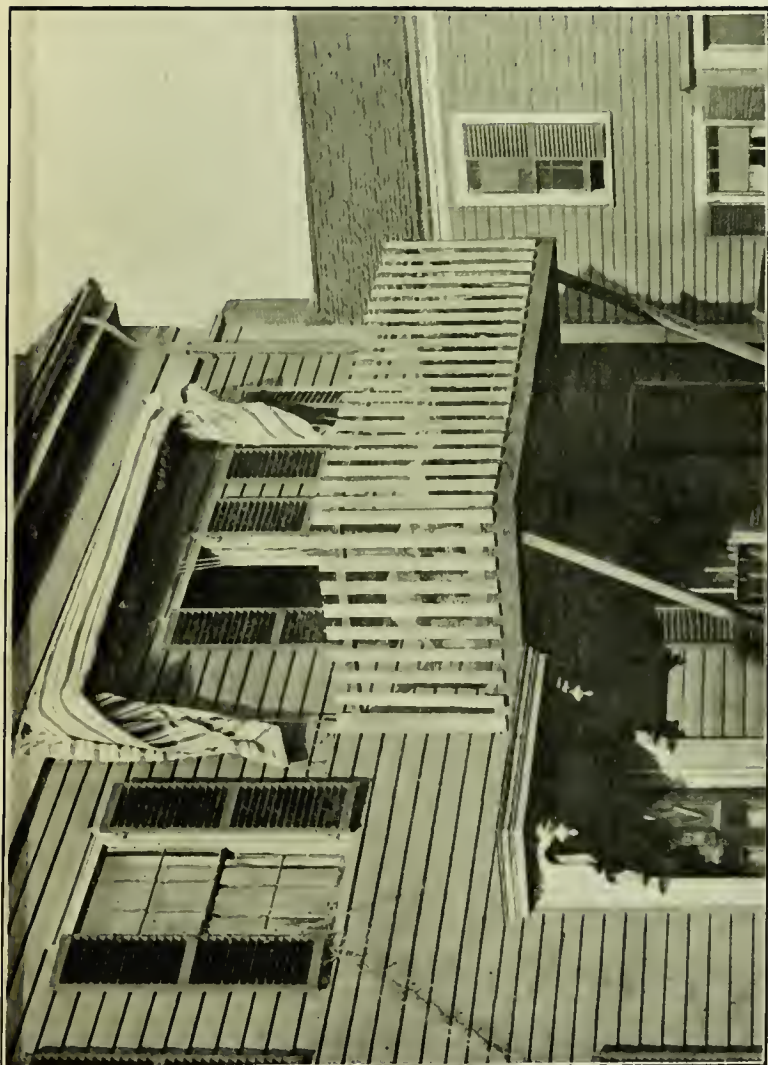
Patient taking rest treatment in reclining chair, January, 1907.



TAKING THE OUT-OF-DOOR TREATMENT UNDER UNFAVOURABLE CONDITIONS.
This man persevered in spite of unpleasant surroundings, and is now nearly well.



PLATFORM AND TENT ERECTED ON PITCH ROOF.



SIMPLE PLATFORM ERECTED BY LANDLORD FOR POOR PATIENT.

It cost only £2 8s. (\$11.50). Neither yard nor roof available in this case. The member of the class for whom it was built had advanced Tuberculosis. He spent most of the day time on this platform, and has slept here every night for a year. He gained 60 lbs. in weight while in the class. After returning to work he put on 3 lbs. more flesh in the first two weeks.



COVERED BALCONY.

Illustration of a type of Covered Balcony thrown out from a bedroom, and used in America in the home treatment of consumption very effectively. The cost of putting up such a balcony is about £3 15s., and the patient can use it day and night, only going into the house to wash and dress.

RESULTS OBTAINED IN THE TREATMENT OF PULMONARY TUBERCULOSIS BY THE CLASS METHOD

By JOSEPH H. PRATT, M.D., Boston, U.S.A.;
Physician to Out-patients, Massachusetts General
Hospital.

Being a paper read in the Section of Medicine at the Annual Meeting
of the British Medical Association, Sheffield, 1908.

(Reprinted by kind permission from the "British Medical Journal.")

THE difficulties encountered in the home care of phthisical patients, especially among the poor in large cities, are well recognised. They have recently been graphically described by Miss C. E. Cummins,¹ Lady Almoner at St. Thomas's Hospital. As evidence that conditions are similar in Boston I may refer to a paper published in 1905 by Robie and Larrabee,² Out-patient Physicians to the Boston City Hospital.

Our patients in the tuberculosis class have nearly all been referred to us from the out-patient department of the Massachusetts General Hospital in Boston, and they have not differed from the out-patients to be found in other large cities. All have been poor and many ignorant. In the class we have treated patients of different races and different nationalities, including English, Irish, German, Russian, Jew, Italian, Negro, and American. One of our first patients was the only member of his household that could speak any English, and he could not write the language.

¹ *Tuberculosis*, London, Feb. 1907.

² *Boston Medical and Surgical Journal*, 1905.

The tuberculosis class is not a tuberculosis dispensary with a different name as is sometimes thought. In an earlier paper I pointed out an important difference between the two, when I said that a tuberculosis dispensary gives a relatively small amount of care to a large number of patients, while a tuberculosis class gives a large amount of care to a small number of patients. The chief work of the physicians in a tuberculosis dispensary is to recognise the disease in its early stages, and the chief work of the nurses is to prevent the spread of the disease to other members of the consumptive's family.

The importance of the dispensary in the tuberculosis campaign is very great, but its value is in the early diagnosis rather than in the treatment of the disease. Several years ago I visited two of the largest and best tuberculosis dispensaries in America and asked in how many cases had the disease been permanently arrested. There was not a definite record of a single case. This was probably largely due to the fact that as soon as the cough and other symptoms disappeared, and the feeling of health returned, the consumptive ceased to visit the dispensary. All medical men recognise that this period of improvement is one of great danger, because the sick man considers himself well long before the diseased areas in the lung are healed.

I wish to report in this short communication the results obtained in the Emmanuel Church tuberculosis class during the past three years. The object of the class was to restore its members to the ranks of wage earners with the disease entirely arrested. Fortunately, those in charge of the undertaking had the wisdom of hope rather than the wisdom of experience. We believed that it was possible to obtain in the homes of the poor results equal to those obtained in sanatoriums, although we realised that the difficulties were much greater.

In other papers¹ I have described in detail the class method. Strict obedience of the rules and regulations is

¹ *Boston Medical and Surgical Journal*, Feb. 22nd, 1906; *Journal of the American Medical Association*, August 31st, 1907.

required. No one is admitted unless in addition to physical signs in the chest tubercle bacilli have been found in the sputum or a positive tuberculin reaction obtained. The treatment employed is rest out of doors in the recumbent position. Exercise is rarely allowed while any signs of active disease are present. The members spend the nights as well as the days out of doors. For this purpose balconies, roofs, or yards are utilised. If all these are lacking, and a simple balcony cannot be built in front of a window, the patient's family must move to a house suitable for the treatment. If necessary, the cost of moving is paid from the class treasury. Small tents and balconies are furnished free, as well as blankets and reclining chairs. These expenses, as well as the salary of the friendly visitor or nurse, have been borne by Emmanuel Church. If I had not received the support of the Rev. Elwood Worcester I should not have been able to have tested the value of this method in Boston. He has raised for this work about £900 since the organisation of the class three years ago.

Close supervision of the daily life is maintained by

1. The frequent visits of the friendly visitor;
2. The individual record book revised by Dr. Minor, in which the patient notes down every detail of the daily life, including temperature, diet, and number of hours out of doors.
3. The weekly meeting, which is the distinctive feature of the class method.

Once a week the members meet together in a large pleasant room at the Massachusetts General Hospital. On their arrival they are weighed by the nurse, who later takes their pulse and temperature, which are entered with the weight in the record book. Those who have increased in weight during the week have their names written on a blackboard with the amount gained. This roll of honour is headed by the member who has made the greatest gain. Once a month the record of those who have spent the greatest number of hours out of doors

is posted. The arrival of all the members and the taking of these observations by the nurse occupies about thirty minutes; this time is spent by the members in pleasant talk. They soon get on a friendly footing with one another, and enjoy this weekly gathering. I and my associate, Dr. Hatch, plan to arrive half an hour after the hour of meeting. Then the record books and the list of gains in weight are ready for inspection. We sit at two small tables and see all the members in turn. The record books are examined, and the patient's questions are answered and advice given. A short note is also entered on the patient's history-sheet. I usually give the class as a whole some advice and encouragement during the meeting, but such a talk is always short, never more than two or three minutes in length. Physical examinations are not made at the weekly meeting, but each member is examined once a month in my consulting room. I do not visit them in their homes, but if they become acutely ill they are seen by my assistant. The membership is limited to twenty-five. Two years ago, owing to the increased number of those applying for treatment, it was necessary to form a second class which is under the charge of my former associate, Dr. N. K. Wood, and is supported by the Arlington Street Church. Success depends on gaining the friendship and confidence of the members. The nurse and doctor must know their individual needs. We are not treating a disease, but sick men. For this reason I believe it is necessary to work with classes of small size. During the past two years classes have been formed in different parts of the United States. One of the most successful is conducted by Dr. W. L. Niles in one of the poorest and most crowded sections of New York City.

RESULTS IN THE EMMANUEL CHURCH CLASS.

Of the 38 who remained in the class until the termination of the disease in death or recovery, 29 recovered and 9 died. All the members who died were in an advanced stage of the disease on admission. Twelve of those who

recovered were in the early stage of the disease; of the advanced cases, 12 might be called moderately advanced, and 5 far advanced. The division into the first, second, and third stages, according to Turban's schemes, although apparently so simple, is really a difficult one to make, and I am not convinced that my classification is entirely correct. Of the total 29 whose wage-earning power has been restored, 20 are known to have been well and working on July 1st, 1908. Of these, one had a slight recurrence in 1907. He re-entered the class, and the disease was arrested. Of 8 no record was received on July 1st, 1908, but at the time of the last report there was no recurrence. The remaining one had a slight recurrence in September, 1907, and again in June, 1908. Altogether 3 of these 29 patients have been at work for more than two years, 13 for more than one year, 3 for more than six months.

The first three patients who entered the class in July, 1905, were known to be well and working on July 1st, 1908. As these patients were also the first to graduate, and as they have been at work a longer time than any of the others, I will present their clinical records in some detail. Everyone recognises that the best test of the value of any method of treating tuberculosis is the permanency of the results.

In the following abstracts the condition is noted at the beginning of treatment, at the end of six months, and after three years.

CASE I.—Minnie E., aged twenty-eight years, house-keeper. Admitted to class July 3rd, 1905. Ill since May, 1904. Cared for mother, who died of phthisis shortly before onset of present illness. Cough, fever, night sweats, loss of weight and strength, loss of appetite, frequent vomiting. Treated in Quebec and Montreal for six months by private physicians who recognised nature of the disease. Went to the out-patient department of the Massachusetts General Hospital in January, 1905. Weight then 106½ lb. Tubercle bacilli present in sputum at first examination. Treated at the

hospital as an out-patient for six months; visited occasionally by nurse (tuberculosis dispensary method). At first examination, after joining class, temperature 99.8° , pulse 100, respirations 26, weight $102\frac{3}{4}$ lb., a loss of nearly 4 lb. while under treatment. There was dulness at the right apex, broncho-vesicular breathing, and many fine moist râles. At the right base crackles were heard. In the left interscapular region slight dulness, bronchial breathing, and râles at end of expiration. Slept on covered balcony. Days spent in reclining chair on balcony or in yard. No gain in weight or definite improvement for nearly two months. Frequent vomiting and persistent anorexia. Rest treatment strictly followed. Became free from fever in September, 1905, and remained so.

Note on January 12th, 1906.—Weight $114\frac{1}{4}$ lbs., temperature 98.6° , pulse 84. She now feels strong, and complains only of occasional nausea and vomiting. Practically no cough and no expectoration. A few râles are heard over both apices. Tubercle bacilli in sputum—Gaffky's scale, No. 2.

Graduated from class in June, 1906, with disease arrested. Weight $118\frac{3}{4}$ lb., a gain of 16 lb.

July 1st, 1908.—Weight 124 lb. Has worked steadily and efficiently as friendly visitor in a tuberculosis class since graduation, except for two months' vacation last summer. She writes that she has no symptoms.

CASE II.—Elmer C., aged fifty-six years, painter. He came to my clinic at the Massachusetts General Hospital in July, 1905, complaining of loss of appetite and pains in the chest. He had had a dry cough since 1900, and spat up a little blood in 1904. For the week previous to visiting the hospital he had been troubled with night sweats. There has been no noticeable loss of weight; slight loss of strength. *Status praesens*: Thin man; bony framework prominent; weight 106 lb., temperature 99.6° F., respiration 18, pulse 92. Mucous membranes somewhat pale. Chest rather long and narrow. Dulness over the left upper lobe in front and flatness posteriorly. Over both sides of chest above spine of

scapula breathing is broncho-vesicular with prolonged expiration. Kronig's isthmus is 2 cm. wide at right apex and 2 cm. at left apex. Many medium-sized moist râles over both upper lobes during both inspiration and expiration, but more numerous on left side; no râles over middle or lower right lobes. Over lower half of scapula a few pleuritic friction rubs heard. Sclerosed radial arteries; tortuous bronchials. No albumen in urine, but suggestion of diazo reaction. Sputum is muco-purulent. Tubercle bacilli present—Gaffky's scale, No. 3. Fluoroscope shows a shadow over entire left lung, darkest at the apex; right lung is clear.

Entered the class July 12th, 1905. Under the treatment he regained strength rapidly. He slept in a wall tent; sides and ends of tent always open except during heavy rains.

Tubercle bacilli not found in sputum after October, 1905.

January 5th, 1906.—Patient looks healthy, skin ruddy, and mucous membranes of good colour. Weight 130½ lb., temperature 98° F., pulse 78. He feels better than he has for years, and weighs more than ever before. He walks four to five hours a day. Moderate dulness at left apex. No impairment of resonances over the right lung. At left apex expiration is prolonged, and a few subcrepitant râles audible after coughing; none heard elsewhere.

Graduated May, 1906, weight 130 lb.

July 1st, 1908. Weight 116½ lb. No symptoms since graduation. Has worked as painter (chiefly indoor jobs) all the time he could get work. Loss of weight during past few months due to insufficient food. Milk will now be supplied from class fund until he secures work.

CASE III.—Zelek P., aged thirty-five, tailor. He came to my clinic in July, 1905, complaining of cough and pain in the right chest. The cough had been troublesome for several months. He had noticed slight loss of weight. Increasing weakness had compelled him to give up work. On examination he was found to have a temperature of 101.4°; respirations 30; pulse 80;

weight 131½ lb. There was dulness over right side of chest, front and back, shading into flatness at apex. Breath sounds were broncho-vesicular over right upper lobe, where a few fine râles were heard. They were increased by coughing. Sputum contained many tubercle bacilli—Gaffky's scale, No. 7.

During July and August, 1905, he suffered considerably from pleuritic pains, but otherwise gained steadily from July 12th, when he entered the class. He lived and slept on his roof in the crowded West End of Boston. Smoke from neighbouring railway terminal troublesome, and sometimes produced coughing. For ten weeks he was allowed no exercise. His temperature became normal in September.

January 12th., 1906.—Weight 171 lb.; temperature 98°; pulse 82. He has been free from all subjective symptoms, but in the scanty expectoration tubercle bacilli are still demonstrable. Examination of chest showed marked dulness, bronchial breathing and intense bronchophony at the right apex in front. A few râles were heard here; none elsewhere.

He graduated in February, 1906. Weight 172 lb. A member of the church fitted up a small tailor's shop for him at a cost of about £12.

July 1st, 1908.—Weight 173 lb. He has worked steadily for over two years and has felt perfectly well.

REPORT OF THE EMMANUEL CHURCH TUBERCULOSIS CLASS, BOSTON, U.S.A.

July 1st, 1905—July 1st, 1908.

29 Graduated—wage-earning power restored.

20 known to be well and working July 1st, 1908; 1 of these had a slight recurrence in 1907; re-entered class; disease arrested.

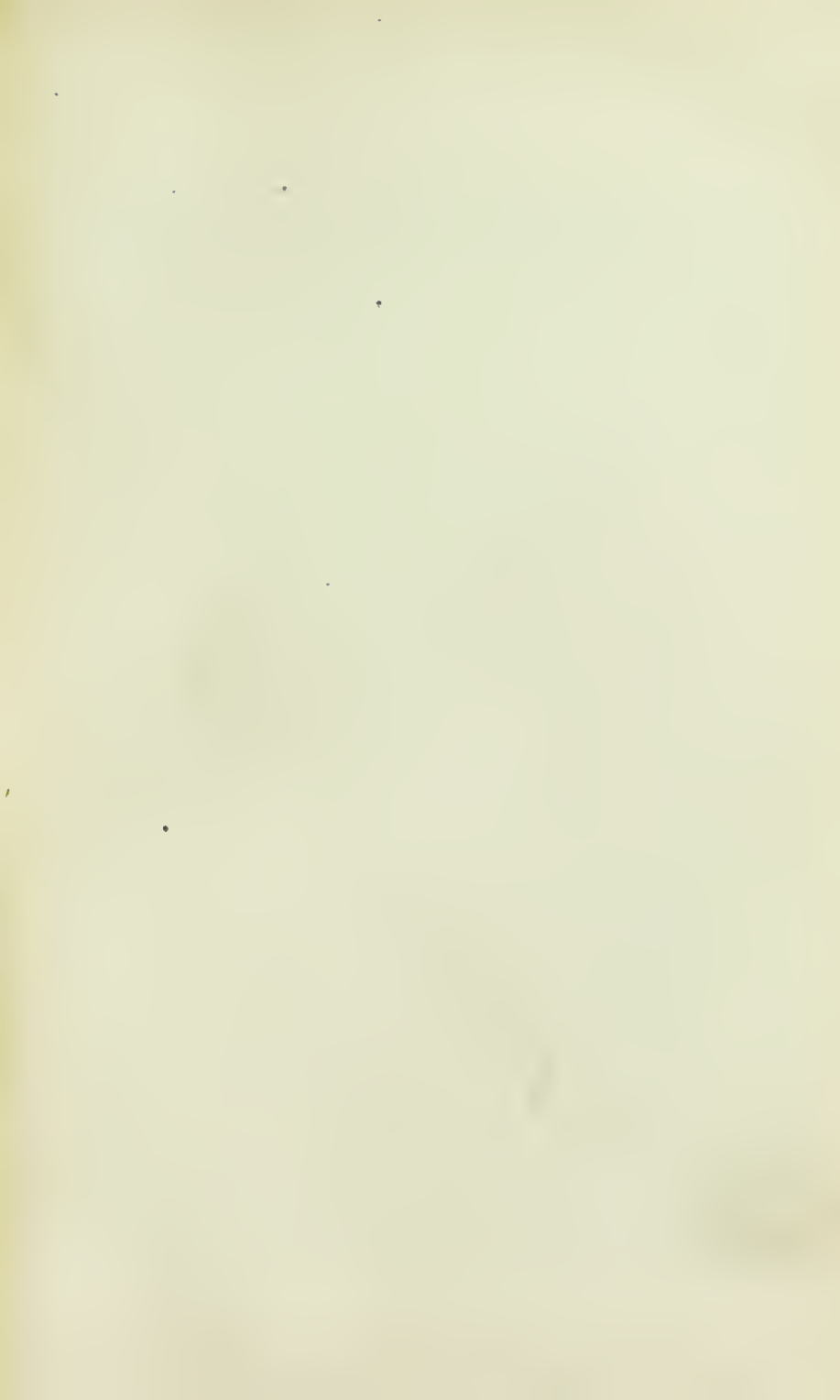
8 record to July, 1st, 1908, not yet received; no recurrence at last report.

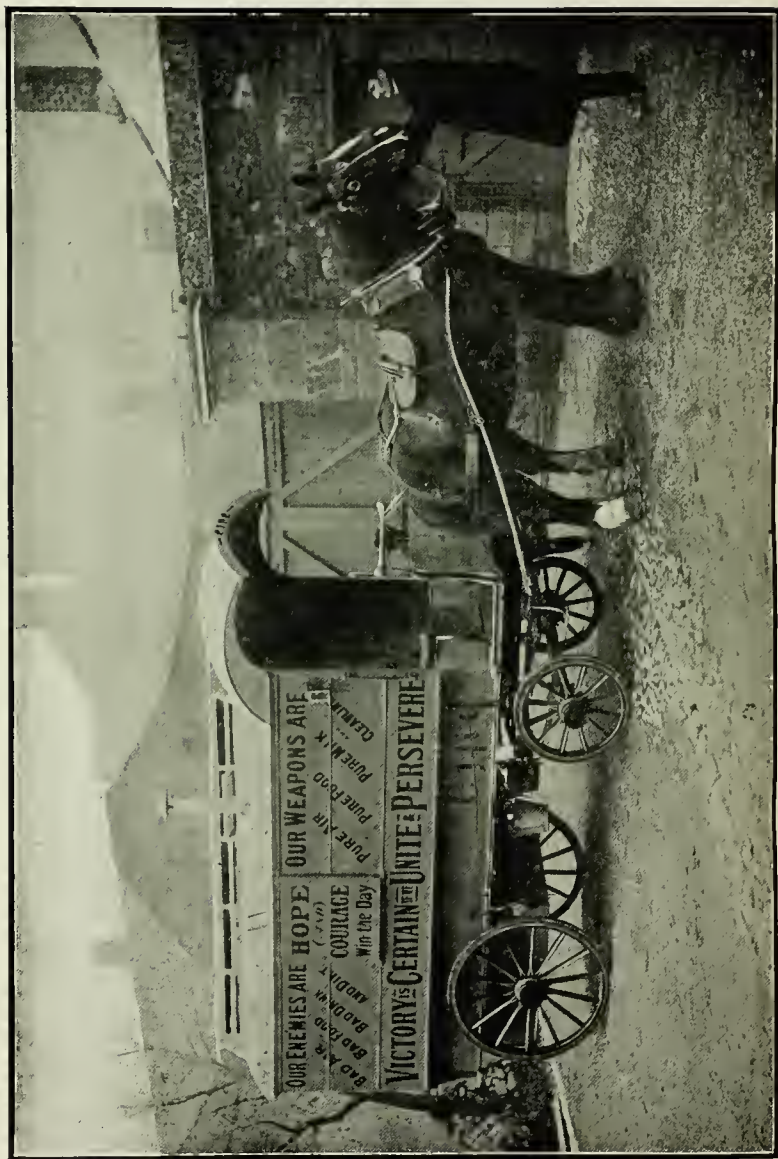
1 had a slight recurrence in September, 1907; and again in June, 1908.

- 9 died. All were in an advanced stage of the disease on admission.
- 4 left the city (3 improved, 1 unimproved).
- 4 left the class against advice because they considered themselves well.
- 1 left the class owing to complicating disease (arthritis deformans).
- 5 discharged for disobedience; 3 greatly improved at time of discharge.
- 12 instructed in their homes but never members; some of these refused to join, others sent to sanatoriums.
- 4 associate members. They follow the treatment at home, but are unable to attend the class meeting owing to their serious condition.
- 20 present members, including 4 who were formerly regular members, but now too ill to attend the class.

88

- 3 of the graduates have been working more than two years.
- 13 of the graduates have been working more than one year.
- 3 of the graduates have been working more than six months.
- 12 of the graduates were in the first stage of the disease on admission.
- 12 of the graduates were in the second stage of the disease on admission.
- 5 of the graduates were in the third stage of the disease on admission.





"EIRE," THE FIRST TUBERCULOSIS EXHIBITION CARAVAN,
 Started on tour beginning of November in Wicklow, and burnt at Lifford, Co. Donegal, after
 having assisted at 370 meetings in the North-West of Ireland, with an attendance of 74,000.

THE TRAVELS OF THE TUBERCULOSIS EXHIBITION CARAVANS

“ EIRE ”

THE Tuberculosis Caravan, which the Women's National Health Association were enabled to purchase and equip through the kind grant of £500 from the Pembroke Irish Charities' Fund, has proved most successful. “ Eire ” carries with her diagrams, charts, pictures, literature of various kinds for distribution, pathological exhibits, a limelight lantern, with slides for illustrating lectures, and a gramophone, which is intended not only to give musical selections to enliven the proceedings, but also wise and pithy lecturettes on matters of health.

The Caravan Company consists of Mr. J. O'Connor, a young medical lecturer, who speaks both Irish and English; Miss Manderson, a cookery teacher and demonstrator; Mr. Fitzpatrick, the custodian, who sleeps in the van; and Cunningham, the driver.

In addition to these, Miss Margaret Molloy, who was in charge of the Tuberculosis Exhibition during the Southern tour, acts as Advance Agent, and advises Local Committees a week or two before “ Eire's ” arrival, so that these may know how to take charge of her arrangements during her visit. The plan adopted for organising the tour by the Central Tuberculosis Exhibition Committee was to depute one of their number, Mr. W. T. B. Walker, of the Congested Districts Board, to map out an itinerary for Donegal. Dr. Brendan McCarthy, Local Government Board Medical Inspector, and two others kindly furnished lists of names of persons likely to be interested in the van's mission in the

various places indicated. Circulars were then posted to these ladies and gentlemen explaining the object of the caravan, and giving notice that Miss Molloy would shortly call to ascertain if a visit would be acceptable. Local Committees are then formed, who undertake to provide for hospitality for the lecturers, the driver and the horses, and who generally also provide material for the cookery lectures. They undertake to make the approaching visit known to the people, and the clergy have been most kind in giving notices on the subject in the churches. The place where the van is to be stationed, the hours and places for the lectures, are all settled by the Local Committees. On arrival at each place, programmes of the day's proceedings, and other literature are distributed, the exhibits are placed on view, and lectures to adults and to school children given—the cookery lectures being a part of the proceedings which is much valued.

The caravan started on the work in November by a week's trial trip to Kilcoole, Newtownmountkennedy, and Newcastle, in Co. Wicklow, and then, after a halt in Dublin to supply omissions which had been discovered, it proceeded by rail to Killeshandra, Co. Cavan, where it had a most warm reception, and from whence it proceeded by road to Trillick, Co. Tyrone, its next halting place, and then, after a short excursion into Co. Fermanagh, the Donegal tour proper was started. Great popular interest and sympathy has been manifested everywhere, and packed audiences have listened to the lectures.

“ PHŒNIX ”

By J. P. O'CONNOR, B.A.

IN March we were travelling by car from place to place owing to the burning of “ Eire ” at Lifford, but on the first of April we received the new van at Fintona, where



"PHENIX," THE SECOND TUBERCULOSIS EXHIBITION CARAVAN.
Started work at Fintona, Co. Tyrone, at the beginning of April, afterwards proceeding to the
West of Ireland.

Miss Manderson also rejoined us, as she had been doing the organising work since Miss Molloy had to go on holidays.

From Fintona we journeyed to Trillick, from whence the van had such a successful start last November, and under Dr. Warnock's care we had good attendances again. From Trillick the van journeyed to Irvines-town, where the tour stopped for the Easter holidays.

Resuming after Easter there was a slight change in the lecturing programme, Miss Manderson in future giving the children's lecture, as I found the strain of lecturing twice daily was injuring my throat. We resumed at Lisbellaw, Co. Fermanagh, and then journeyed to Belcoo, which latter place was made the centre for the outlying districts of Glengavelin and Dowra. At Belcoo I had the pleasure of having a day's fishing with Dr. Tate, and also of visiting the Shannon Pot, where, as a very small stream in the Cuilcagh Mountains, the Shannon rises.

From Belcoo onwards towards Sligo the country improves wonderfully in appearance, and if it were better known would prove a very formidable rival of Killarney. From Belcoo we went to Glenfarne, situated at one end of Loch MacnEan, then on to Manorhamilton, where there is a very old ruined castle belonging to the Earls of Leitrim, and then to Dromahaire, one of the loveliest places throughout the whole country. Everywhere there is a great improvement in the appearance of the country, both as regards the houses and the people themselves, and everywhere a great interest is taken in this campaign, the attendances at the evening lectures in both Glenfarne and Dromahaire necessitating them being held in the open air.

Dromahaire is a very interesting district historically, and Dr. O'Carrol drove us to see O'Rourke's Castle and Breffni Castle, also the old Abbey, all of which are in ruins now, but great monuments of the past, showing what an active centre it must have been in the old times.

Next we visited Collooney and Colaney, and two

miles from the former is Ballysodare, where large flour-mills have been re-started, and, I am glad to hear, have received a great amount of support, and it is to be hoped that many more towns in the West will try and start flour or oat-mills and grind down their own corn instead of buying the foreign made stuff. I am sorry to have to say that, compared with the North of Ireland, there is not nearly the same amount of oatmeal used in the West. In the North nearly every village has its mill working, and in one case I know where the miller's income for the past year has gone up by £6 a week, due to the great increase in consumption of oatmeal. In so many parts of the West we see the mills still there, but idle.

Next the van went to Ballymote, another historical district, where there is an old ruin where "the Book of Ballymote" was written long ago. The majority of the houses everywhere were remarkably clean, and it is rare that one would see a manure-heap anywhere, whether it is that the time of the year prevented one from seeing them on account of farming operations or not, but to me it seemed that all were combining solidly to keep their homes inside and outside as clean as possible, and so combat best with disease.

Next we visited Banada Abbey, under the charge of the Sisters of Charity. This is an old house that formerly belonged to a family named Jones, and who presented it to this Order, and who have now formed a very fine convent with boarders, and also classes in lace-making, &c., for the girls of the district.

Tubbercurry was next visited, and then Swinford, where the evening lecture was in the open air. Next to Charlestown, over which Father Keaveney is Parish Priest, and who has lately made wonderful improvements in it—a system of drainage, electric light installation, town hall, lace classes, all being due to him.

Then the cathedral town of Ballaghaderreen was visited, and received a very cordial welcome from Father



THE TUBERCULOSIS EXHIBITION CARAVAN ON TOUR.

Gallagher, Adm., acting for Dr. Lyster, the Bishop of the Diocese.

Next we visited Kiltimagh, where Father Denis O'Hara, P.P., has made such wonderful improvements since he took charge of it. Next to Claremorris, where we also received a very good welcome; then to Ballyhaunis, where we had very good attendances too, and where Dr. Crean has his dispensary.

Next it paid a visit to Castlerea, which was also made the centre for some outlying districts, such as Cloonbonif, Treen and Ballinlough, in all of which there were very good attendances. Mr. Byrne, V.S., of Roscommon, gave a lecture at Castlerea on consumption in cattle.

Then the van continued its journey to Ballindine, and then to Hollymount, and on to Ballinrobe. At this latter place Dr. Mahon, of Ballinrobe, delivered a very interesting lecture on the "Surgical Forms of Tuberculosis," and illustrated it by actual specimens. From Ballinrobe I went to visit the old Abbey of Cong, and in an old chamber there I saw many skulls, in all of which there were fine sets of teeth. I wondered if a hundred persons were now examined would five of these be found with a complete and healthy set, showing the great difference in the food taken now compared with what they took long ago.

Next we visited Westport, or as it is known in Irish, "Cathair na Mairt," the "City of the Beef." Here Dr. Bermingham lives, who has been one of the leaders in this campaign against consumption, having started it ten years ago, and who has made so many very fine models and charts.

Next we came to Newport, where one of the largest, if not the largest, meeting on the whole tour was held, out in the open, and it raining most of the time. A more orderly meeting could hardly have been obtained.

Up to the present (at Castlebar, 25th May, 1909) there have been given three hundred and fifty-seven lectures,

Miss Manderson having delivered one hundred and twenty-five and I two hundred and eleven, this being the one hundred and thirty-fifth place to be visited on the tour. The total attendance has amounted to one hundred and five thousand five hundred.

PART II

PAPERS DEALING WITH OFFICIAL WORK
IN CONNECTION WITH THE ANTI-
TUBERCULOSIS CRUSADE AND THE
TUBERCULOSIS PREVENTION ACT OF 1908

WHAT ATTITUDE SHOULD THE LOCAL GOVERNING BODIES ASSUME ON THE TUBERCULOSIS QUESTION ?

LECTURE BY MR. P. J. O'NEILL, Chairman of the
General Council of Irish County Councils and
Chairman of the Dublin County Council.

SURGEON TOBIN in the Chair.

THE title of my address propounds a question of vital importance to the movement now so vigorously pushed forward for dealing with the tuberculosis scourge. Like most other questions affecting the public weal, the problem under discussion has its commercial and utilitarian aspects as well as its philanthropic and scientific. The philanthropic aspect of the question has been warmly advocated by her Excellency the Countess of Aberdeen, who in this as in all other questions has manifested a kindly and sympathetic interest in everything that pertains to the well-being of the people of Ireland. The scientific aspect has been discussed in its many varying phases during the past few weeks by several distinguished members of the medical profession, who have so unselfishly devoted themselves to the consideration of schemes for the abatement of this widespread malady. It is right that the self-sacrifice and devotion of so many eminent members of the medical profession in the interest of suffering humanity should

be gratefully acknowledged on behalf of the public. Conferences have been held and discussions have taken place whereat every conceivable method of dealing with this scourge has been debated, and a consensus of opinion has declared that certain expenditure must be undertaken and certain legislative changes must also take place if any adequate effort is to be made for dealing with this problem. It would be idle, if not impertinent, for a layman to discuss, much less to dissent from, the decisions arrived at; and I think those who are interested in this question from an administrative point of view would do well to be guided entirely by the views expressed after such mature deliberation. Whatever scheme may ultimately be put into operation, the local governing bodies must be relied upon to carry these schemes into effect; and in the remarks I propose to make in this subject I shall endeavour to answer the question asked at the outset and to give some reasons why the answer should be what I indicate. After close deliberation and scrutiny the medical conference decided on recommending the following:—First, notification of tuberculosis; secondly, the inspection of food, meat and milk; thirdly, the inspection of schools and school children; fourthly, the question of hospital and sanatoria accommodation in the country. It is a well-established fact that if the disease is not treated in its incipient stage that the possibility of cure is very largely discounted. The necessity of having patients who are in the early stage of the malady under medical supervision will, therefore, be apparent, and it is only possible to carry this into effect by having the malady included amongst notifiable diseases. It is not suggested that notification entailed the drastic provisions which are applied to other maladies under this Act. A fruitful source of infection to which many cases have been directly traced is the supply of milk derived from animals suffering from tuberculosis in some of its stages. The exact moment at which a cow suffering from tuberculosis may yield infected milk is extremely

difficult to determine; but, in order to safeguard the public health, so far as is humanly possible, every effort should be made by local administrative authorities to ensure a thorough and efficient examination of cow byres, milk shops, and all utensils connected with the distribution of milk. This should not be a matter of any considerable difficulty, nor indeed of any considerable increase of expenditure, as all the local authorities have already in their service highly qualified veterinary inspectors who would be competent to discharge such duties for slightly increased salaries. The inspection of meat is somewhat more complicated, and, possibly, may lead to a more largely increased expenditure. In a recent issue of a Scottish agricultural paper I saw a report of a prosecution instituted by the local authority in Edinburgh against a farmer who had exposed for sale the carcase of an animal certified as suffering from tuberculosis. A conviction followed, and a fine of £50 was imposed on the accused. I cite this case to show what a burden might be placed on an industry already overtaxed and fighting for its very existence against the condition which free trade imposes; and, as the local public bodies are largely composed of men engaged in the agricultural industry, I think it would be futile to invite them to put into operation a scheme which might militate against their own interests. When dealing with a somewhat analogous question some years ago the Government undertook to defray the entire cost of all the animals slaughtered by the order of their inspectors, because they had been in contact with cases of pleuro-pneumonia. I think the application of the same principle might be demanded in this connection, and it would not be unreasonable to expect that the Government of the day should bear the loss, when it could be proved that a vendor offering the meat for sale was innocent of any attempt at wilful fraud. The expenditure under this head might be substantial at the outset, but I have little doubt that radical measures would prove more economical in the end, and, as in the

case of pleuro-pneumonia, the disease would in the course of a few years entirely disappear. The inspection of school children is a provision the importance of which cannot readily be over-estimated. As there is a consensus of medical opinion on the necessity of dealing with the first symptoms (and in weakly and ill-nourished school children the germs of this terrible malady find ready victims), how far it might be possible to undertake the care of debilitated children is a question of detail which we need not now stop to discuss.

There can be little doubt that if any adequate attempt is to be made to arrest the progress of this insidious malady sanatoria, in accordance with modern ideas, must be provided. The capital cost on these buildings must reach a considerable sum, and the cost of providing them should, in my judgment, be entirely borne by the State. The maintenance of patients detained in these institutions will be of a very expensive character, as they must be maintained at a standard that bears no comparison with any other existing public institution. The treatment of tuberculosis demands that the patient shall be provided with a high-class nourishing dietary, and it is unnecessary to point out that this cannot be procured without very considerable outlay. Recognising its duty towards another afflicted section of the population, the Government provides a capitation grant towards the maintenance of inmates of lunatic asylums, and the Imperial contribution towards this expenditure covers more than one-third of the actual outlay. A *pro rata* capitation grant in aid of the maintenance of patients in sanatoria is not, I submit, an extravagant claim. As in all other institutions, a classification seems to be an absolute necessity, and those who are suffering from the malady in its more acute and advanced stages must, of necessity, be kept in separate buildings from those who have been only recently attacked. Hospital accommodation must be provided for those who are suffering in the more acute and advanced stages of the disease, and in the county infirmaries it may be possible to make some

provision for this class of patients. In almost every instance County Councils make large contributions to the up-keep of county infirmaries, and I submit it is only reasonable to expect that the governors of these institutions would devote separate wards to the treatment of consumptive patients, and thereby relieve in some degree the cost entailed by dealing with this class of patients. The prevalence of consumption in Ireland is traceable to many causes—the insufficiency of the food on which many of the humbler classes subsist, and, above all, to the insanitary and overcrowded houses in which they are compelled to live.

Much improvement has, no doubt, been wrought in recent years in rural districts, at least, by the erection of cottages under the Labourers' Act, but there still remains in certain districts a large proportion of dwellings entirely unsuitable for human habitation. In large cities the tenement houses are hot-beds for the dissemination of this disease. Corporations and urban authorities should avail of every means of putting an end to a system so detrimental to the health and morality of our people.

Some of the less progressive of our local governing administrators may inquire why additional burdens should be placed on an already overstrained taxable community. My answer is that no monetary expenditure should be allowed to forbid or curtail the development of any scheme devised for the purpose of safeguarding the public health. If we have been remiss in the past now that the dangers which confront us are realised, there should be no hesitation in carrying out the schemes for remedying what is recognised as a national calamity. Another cause, and, I fear, a very fruitful one in the development of the tubercle bacilli, is the tendency which prevails amongst a certain section of the community to indulge freely in the use of intoxicating drinks. Apart altogether from the baneful influence which this unhappy propensity exercises on the constitutions of men, there is the further danger to which they

so often subject themselves of contracting chills when unable to take rational care of their own health.

I would like to point out that if the expenditure suggested is new, it would, in my opinion, reduce many of the charges which are and have been borne for generations without exciting comment. It is obvious that if the breadwinner, who is responsible for the support of a family, is stricken down with disease, leaving behind a helpless widow and children, that these must of necessity become a burden on the rates. The children become inmates of orphanages or industrial schools, as expediency may point out, and must be there maintained at the public expense until they reach an age when they are capable of making their own livelihood. Take another case in which the young mother at a time of unfavourable vitality is stricken down by this disease and falls a victim to a fatal attack, leaving behind helpless children to the charge of a brutal and ill-natured father. Here, again, a tax is imposed upon the community, for the children become vagrants on the streets, and it is necessary for their own protection—moral as well as physical—that they should be detained in some institution at the public expense. If prevention is better than cure, it is certainly more economic to make an effort to save valuable lives than to provide for the consequences which these fatalities must necessarily entail. I recall these facts for the purpose of pointing out to the local authorities that a certain diminution in existing charges must inevitably follow on the development of modern schemes for extirpating the tuberculosis plague. Local taxation is compelled to provide for the maintenance and up-keep of lunatic asylums, and it is contended that in some respects there is a close analogy between lunacy and tuberculosis. On looking over the registers in lunatic asylums one is forcibly struck by the fact that in a very large number of the cases which terminated fatally, tuberculosis is certified as the cause of death. Economy may thus be effected if the successful treatment of tuberculosis diminishes the number of those

who are deprived of the use of reason. The prevalence of this malady is a menace and a danger not alone to those who are in actual contact with patients, but to the community at large; and this fact would, I think, justify the local governing bodies in making whatever demand may in reason be required for meeting this terrible scourge. It may be interesting to note that in this metropolitan county of Dublin steps have already been taken for the purpose of providing the necessary means of dealing with tuberculosis in accordance with modern ideas. A conference has been held, at which representatives of every local governing body throughout the city and county have attended, and they have decided to recommend their various councils to strike a rate to meet their proportion of the necessary expenditure. A further step has been taken and a Joint Hospital Board has been established with the sanction and approval of the Local Government Board. I regret to say that for some inexplicable reason two of the urban districts have refused to join in this very laudable enterprise; and, although I strongly deprecate central interference with local governing bodies, I am of opinion that some central body should have the right to compel non-progressive and contumacious bodies from standing in the way of schemes undertaken for the protection of public health. In the course of this paper I hope I have indicated that, in my opinion, the attitude which should be assumed by local governing bodies is one of friendly and sympathetic co-operation with whatever scheme may be decided on for the purpose of stamping out this plague; and, although it must entail some additional burden on the taxpayers of the community, I submit there is ample justification for making this demand. It would be impossible at this stage of the discussion to define and determine every detail necessary for the purpose of giving effect to this object, but I hope that the critics and fault-finders will devote their ability and energy to the perfection rather than to the destruction of the scheme.

MRS. NUGENT EVERARD said : I am sure I am voicing the sentiment of everyone present when I say that we wish to thank Mr. O'Neill most cordially for his most interesting and instructive address. He speaks with authority as the Chairman of the General Council of County Councils in Ireland, and I think we may also say that we hope that he will be the means of influencing those with whom he comes in contact. What he has told us is most interesting and most instructive. Of the many matters he touched upon some are, of course, debatable, and there are some others which it will take a great deal of trouble to persuade the different County Councils to adopt. One particular matter that he spoke about was the inspection of meat, and he thought—and very wisely thought—that it might be possible that the owners of animals suffering from tuberculosis, and which were slaughtered, should be recompensed if it was considered that they were unaware of the existence of the disease. When the foot and mouth disease first broke out the cattle of a member of a particular board of guardians caught it. A resolution was passed that every animal in the field should be destroyed, and there was no further case of foot and mouth disease in the entire district. That shows that it is possible to stamp out infectious disease if it is taken at the beginning. I have much pleasure in proposing a vote of thanks to Mr. O'Neill for his most instructive and interesting lecture.

DR. DELAHAYDE said : I have very great pleasure in rising to second the vote of thanks to Mr. O'Neill for his very instructive and very interesting address. I seldom listened to a professional address with more pleasure than I listened to his this evening. As one of the District Medical Officers of Health I am in a position to see the great ravages which tuberculosis creates in our midst, and I would aid in any way I could to diminish the serious loss which occurs from it in our own city here. As to the means of combating it in private homes, and especially in the homes of the poor, that is a matter

surrounded with very great difficulty. The sentiment that runs through our people of clinging to our own in sickness will offer very great obstruction to our carrying out any method of separating those attacked with tuberculosis from their families. However, a step in the right direction will be taken if, when these sanatoria are provided, they will be conducted on lines that will not in any way humiliate or give the taint of pauperism to anyone who enters them.

As regards the Dublin Union Hospitals—which are now about the best hospitals in the city—a great many people that I tried to induce to seek hospital relief objected to go to these institutions simply because of the taint that is put upon them and not from any doubt as to the benefit that they would derive. I think that if we adopt these sanatoria we should, as far as possible, remove from them any possibility of the taint of pauperism.

With reference to the meat in Dublin, having some knowledge of the important markets in Dublin, and having on many occasions to go to the abattoir, I do think that we in Dublin are particularly free from diseased meat. I have on several occasions gone to the abattoir, sometimes as deputy for Sir Charles Cameron. On a few occasions I have examined the meat, and I must certainly say, from my knowledge of the meat market in this city and of that of Liverpool, and comparing the two, I do think that we here in Ireland are fortunate in having so little diseased meat amongst us. That can be explained in different ways. In London and Liverpool and these large English cities the butchers are really meat vendors—that is, they buy the animal dead—whereas in Ireland our butchers buy their own meat, and as they are mostly men who are very good judges in that particular line, you will generally find that our meat is for that reason better, because it is bought by the man who stalls it, and it is much more healthy than what is purchased in the large markets and in the large towns in England. With regard to the

inspection of school children, that is a very difficult problem.

Having had occasion to examine schools in connection with the measles and scarlatina outbreaks some years ago in our city, I can say that that is a portion of the problem which, though it seems easy, will be most difficult to deal with. You go to a school, and you see the children there in a semi-clean state. You will see how different are their homes—so filthy and dirty. There is a great deal of that amongst our poor. If the inspection of schools is carried out it must be carried out by a different set of local inspectors from those engaged in the poor law service; and, furthermore, I do think that the sooner the medical officer of health is made independent of the present poor law system the better it will be for the general sanitation of Ireland. It is a matter of difficulty for a medical man acting as a medical officer of health to place himself in a position which is very injurious to himself, as far as his practice is concerned. On one occasion I had a very bitter experience in discharging public duties. A medical officer of health, if he is to properly discharge his duty in a district, should be appointed independently of the local body, and should act independently of, but in conjunction with, them. I am sure that the suggestions that Mr. O'Neill has made will form the basis from which we will be able to evolve a system that will be of use to the country. As to the cost, Ireland's taxable capacity is over-strained, and any of these improvements that we seek to make that will involve taxation will meet with opposition; and not alone will it meet with opposition, but, what is worse, it may be established, but it will be strained and cramped for the want of sufficient and proper support. Speaking as an individual I should say that in all matters of public health it is the duty of the State, and not of the locality, to attend to the matter; and I think the greater portion of the initial expense that will be involved by this movement for dealing with tuberculosis should, and ought to, be borne by the State. It may be a question as to

whether that contribution from the State should be permanent or not. But having regard to the present state of most of the rural districts of Ireland—the poverty and the want of trade, and the want of business, and the general stagnation which leave a locality unable to meet any heavy taxation—the State ought to contribute all the initial expense, and a certain annual sum very nearly representing the total cost, at least, say for a period of twenty years. If in that time the disease can be stamped out, and the general health of the community become better, and the energy of the people be to a great degree returned, and business consequently improved, then it might be that they could bear taxation to meet the up-keep of the system better than they can do it now. I, therefore, say that the Government should bear the initial expense; and the question of its being a permanent or a temporary contribution should be a matter for future determination. The State should guarantee the main cost for at least about twenty years, so as to give the rising generation an opportunity of being brought up under better conditions than the generation which is now passing away. I have great pleasure in seconding the resolution. I thought it was well that a professional man should have something to say on a subject so well treated by Mr. O'Neill.

REV. FATHER CORBETT, O.D.C., said: I desire to add a few words of praise of the very interesting and instructive lecture delivered by Mr. O'Neill. In dealing with this very difficult question Mr. O'Neill has, of course, touched upon the question of financing this vast scheme, and his thesis is that the expense of establishing sanatoria all over the country will not be as great as the expense now entailed upon the country by the up-keep of the lunatic asylums and the workhouses. Mr. O'Neill thinks that the initial expense ought to be borne by the Government. We all agree with that. The more money we get from the Government the better. I believe with Mr. O'Neill that the cost of sanatoria

throughout Ireland will not at all be as great as the up-keep of the lunatic asylums and the workhouses; and even if it were I believe that the amount of good, from a health point of view, that would be effected by these sanatoria will certainly be worth the initial expense entailed to the country at large.

SURGEON TOBIN said: We all, in our individual capacity, look upon health as the one thing necessary. I mean that we call upon the physicians or surgeons to mend us if we are broken up in any way. The same thing applies to our families, to our households—health is before everything. If a man is going to select a house he first sees what about its sanitary condition. If his child is sick he keeps him from school for six months even, if his health should then be in danger, and so on. We realise in the most absolute manner for ourselves and those immediately around us that health is all-important. And not only do we recognise it for ourselves, but we recognise it for our bicycles and our motor cars, and everything else. Is there any man who does not look after his motor car, and who, if he is not satisfied that the tyres and everything else with it are all right, fails to incur the expense of putting them right? For the simple reason that he knows that it is good economy. But when men come to act in their corporate capacity they seem totally to forget that fact. I am told that it is the custom in many parts of Germany that when a person buys a cow he buys it just as we buy a horse here—subject to a veterinary surgeon's opinion. In Germany a man buys a cow subject to its passing the tubercular test. If that grew up into a custom here it would be a most useful thing; it would do much to stamp out the disease, because there would be a gradual removal from the market of unsound animals, just as unsound horses are now removed. If it became necessary to adopt very sweeping measures it would be less expensive if it was led up to by some such action. Anyhow, the thorough discussion that is now going on on this question, the fact

that business men, men of ability, who have shown in their own affairs great acumen, are taking it up and turning their attention to it, must eventually lead to a successful issue. I am told that in Norway, where leprosy prevailed very much at one time, eight sanatoria were constructed to receive such cases, and I am told that of those eight only two are now occupied. There are six derelict, simply because the campaign has been so successful against the disease there are no occupants of them. That is a very hopeful thing. What if in some eight, or ten, or twenty years all our sanatoria would be in the market, simply because there were no patients to put in them. There is no reason why it should not be. And not only that, but I state it will be, because there is every promise in the interest which now exists in the question that such an issue will be attained. I put the motion that a vote of thanks be tendered to Mr. O'Neill for the admirable address to which we have all listened.

The vote of thanks was passed unanimously, and Mr. O'Neill having suitably replied, the meeting terminated.



HOW SCHOOL TEACHERS CAN AID IN THE FIGHT AGAINST TUBERCULOSIS

AN ADDRESS GIVEN TO A MEETING OF SCHOOL
TEACHERS BY PROF. E. P. CULVERWELL,
Trinity College, Dublin.

THE RIGHT HON. AUGUSTINE BIRRELL, Chief Secretary
to the Lord Lieutenant of Ireland, in the Chair.

PROBABLY the first thing that will strike you is that I, who am no expert in this matter, have been asked to address you. I see before me gentlemen who have far more knowledge of the subject than I have. But I think, perhaps, I could explain why I have been called on—that it is an object-lesson to show that this was the battle of the man in the street and not of the expert; that if it were left to the expert only it would be unsuccessful, and that in this fight the man in the street is of more importance than the expert, because he is more numerous. We owe a deep debt of gratitude to those personages in exalted positions who have given up so much time for the purpose of showing to the public the vast importance of the campaign in which they were all engaged. It is for us to show that we, too, can realise the importance of this matter and give real attention to it. On you especially as teachers of the young and as students in training, who may soon be scattered over the length and breadth of the land, a special respon-

sibility rests. As missionaries through the country there is no class of men who can do as much as you can, except the ministers of religion. If the teachers and the clergy could bring home to the minds of the people the wonderful facts which had been revealed to the world by scientific men, and could influence their wills to realise that these facts are living realities—things to be taken account of in daily life—then consumption would not last long in Ireland. If you would be missionaries you must understand the gospel you would preach. Then your missionary duty is to convince others that it is a gospel—a good news of health and of salvation from disease, and last, and most important, to get them to act on their knowledge. My duty is to give you the facts. To you yourselves, aiding and aided by the great attention which is now being directed to the subject, I must leave the last and most important section of the work. I may help you to influence the reason—to influence the will must be your task.

First, then, what is the nature of our foe and what are the weapons with which we can fight? As we all know now, the one and only cause of all tubercular disease is the tubercle germ. It is far too small to be seen by the naked eye. When magnified one thousand times it appears as a thin and somewhat irregular line about one-eighth to one-quarter inch long. From this you will easily see that since areas increase as the square of the linear dimensions, about one million of the germs, placed side by side in a single layer, would be required to cover such a line, while a number equal to the whole population of Ireland would be required to cover a fairly thick line of that length.

The germ multiplies as it grows; at first it increases in length, and then splits into two—a process which, under favourable circumstances, leads to an extremely rapid increase. There is no infection so long as the germs remain enclosed in the patient's body; but if they continue to multiply within it a time comes when the system gets rid of them, and then the infection

may be spread to others. If the infection is in a joint, a sore will open, and the germs are discharged with the pus. If it is in the lungs, the spit or phlegm which is coughed up will contain countless numbers of germs. This phlegm is the great source of infection. When wet it is indeed very unlikely that the germs it contains will get back into the body. But when left on the ground or floor to dry the germs may get anywhere. For the dried phlegm will in time get rubbed into powder, and then it will become part and parcel of the surrounding dust. The dust will look like ordinary dust; there will be nothing to show that it is a most deadly poison. The life of the germ in this dust depends on circumstances. If it be freely exposed to air and sunshine it appears to die in two or three days, or less, but if allowed to remain in dark, damp, or badly-aired rooms, it lives on in a passive condition for a long time. If, then, the tubercular germs in spit or pus are not destroyed when they leave the patient's body, the tuberculous dust from them will almost certainly get stirred up some time or other, and it may then get into the body of the patient or his friends, or of some complete stranger, either by being breathed into the lungs or swallowed with the food or working its way through the skin, especially where it is broken.

While there is little danger from the phlegm until it has got into dust, it is quite different with the tiny drops which are scattered as a very fine spray when a consumptive person coughs. Careful experiments have shown that if the air of the room is still these tiny drops may remain floating about in it for half an hour or longer after the cough—just as the very minute drops of water which we call fog remain hanging in the air for a long time, while the larger drops, which we call rain, fall to the ground at once. If this invisible tuberculous spray is not quickly scattered by fresh air entering the room, it may be breathed back into the lungs of the patient, and perhaps infect a different part of the lung, and thus add greatly to the severity of the attack, or if

breathed in in a concentrated form by a healthy person it may infect, and, perhaps, ultimately kill him, especially if his lungs be delicate at the time.

This is one reason of the immense importance of having the freest possible ventilation around a consumptive patient, both for his own sake and that of those who attend on him. Plenty of fresh air lessens the danger of infection in several ways. By mixing fresh air with the infected air it reduces the number of germs entering the lungs with each breath. Fresh air also diminishes the vigour of the germs themselves. In addition, it helps in the cure of the lungs themselves.

So far, I have only presented the gloomy side of the picture. The bright side is that which shows the wonderful arrangements by which the body defends itself. First, the germ has to overcome the mechanical defences of the skin and the little hairs which line the softer passages of the nose and entrances to the lungs, and help to prevent the germs from making a lodgment in the tissues. But when a strong dose of infection reaches the passages of the lungs, or gets to the stomach or to a broken part of the skin, the germ will often make its way to the tissues, and the patient becomes infected. But that is not the end of the matter. On the contrary, the fight is only beginning, for the blood comes to the rescue of the body.

The blood consists essentially of three constituents. First, there are the red corpuscles, like tiny living dots, which are concerned chiefly in the nourishment of the body. Second, there are the white corpuscles, or the tiny white dots, somewhat larger than the tubercle germs, which are really the sanitary guardians of the body. Third, there is the serum—that is, the thin liquid in which these corpuscles carry on all their work. The part played by the last two constituents of the blood is one of the most remarkable discoveries of science. When the tubercle germs have got inside the body, a message is sent to the white corpuscles in the neighbourhood by some means not yet discovered. At once

they crowd to the spot, and attack the tubercle germs. They literally eat them up. At least they eat as many of them as they can. If they succeed there is an end of the attack before anyone knows anything about it. This kind of thing goes on regularly. But if there are too many tubercle germs or too few white corpuscles, the battle will end in the victory of the tubercle germs. Whether the patient can throw the infection off or not will then depend on whether his white corpuscles, beaten in the first skirmish, can do better when they bring up their reserve forces from more remote parts of the body. If so they may after a time succeed in killing all the tubercle germs, so that his recovery is complete. Not, indeed, quite complete, because portion of the tissues where the struggle took place will have been destroyed.

The struggle often takes this form, and probably the patient only knows that he is a little run down. This is proved by *post-mortem* examinations of persons who have died from other diseases, and in whom these lumps of dead tissue are found. In this way it is ascertained that there is only a very small proportion of those past middle age in whose system the tubercle germ has not at some time effected such a lodgment. This shows how vitally interested you all are in banishing the tubercular germ, for at present it is practically certain that it will at some time or other overcome your first and second lines of defence, and whether your reserves of white corpuscles will be able to retrieve the disaster is really a matter of chance. Not only may your constitutional power of resistance be small, but he who, when in vigorous health, has successfully resisted it may succumb when run down. Moreover, it has been fully established that a large dose is far more effective than a small one, and that there are very different degrees of vigour in the bacilli. Animals infected with tubercle taken from the lungs of one who has died from a very severe and rapid attack of consumption show correspondingly severe and rapid symptoms, while those similarly infected from mild cases show correspondingly mild

symptoms. So long as there is such an abundance of tuberculous dust about who can tell what his risks are?

If the white corpuscles cannot kill the invading germs they have another resource. A temporary victory, at least, may be gained. They may be able to stave off the danger by building a protective wall round the tubercle germs, so as to prevent their spreading. In this case the final result may be that the tubercle germs may ultimately die, when so much of the tissue will become solidified, or that after a time, perhaps when the patient is in a low state of health, the protective wall gives way, so that the germs get free again, and the disease spreads as they multiply. The discovery of the part played by the serum in this battle is due to Sir E. A. Wright, a native of Dublin. He showed that the difference in the fight made by different people is not due to a difference in the quality of their white corpuscles but to a difference in the quality of their serum. Take different sets of fifty corpuscles from different people's blood, and put them in serum taken from Mr. A. Each set will be a match for the same number of tubercle germs. But put them to fight the tubercle germs in Mr. B.'s serum, and they may make a far better fight. Then Mr. A. is in that respect far more liable to take the infection than Mr. B.

This discovery of Wright's is of great practical value, for he has shown that it is possible, by means of the opsonic treatment, as it is called, to modify the character of Mr. A.'s serum so as to make it as effective as Mr. B.'s, or even more so. This treatment is often very successful in diseases of the skin and joints, where the white corpuscles can readily get at the tubercle germ, but it has not as yet been successfully applied to advanced cases of consumption of the lungs.

One of the most remarkable properties of the serum is that the result of a slight struggle between the tubercle germs and the white corpuscles is to make the serum more effective than before. This is true of most, if not all, germ diseases. It explains why doctors so seldom

take fevers from their patients. Being constantly exposed to *very small doses* of infection, their serum becomes most efficient in aiding the white corpuscles. But, observe, the doses of infection must be *very small*. If they be somewhat larger, the general strength will be lowered by the infection, and with it the power of resistance will be lowered.

This also explains why it is so much safer to attend a consumptive patient right through from the early stages to the end than to begin attending when the disease is very far advanced. For at first the nurse gets a succession of small doses of infection only, which can be easily overcome, and which improves greatly the **quality** of her serum, so that when the later stages come she is in a far better condition for resistance. Thus, one member of a family nursing another from the commencement, and using all proper precautions, has the best hope of escaping unharmed even from those last stages of the disease, in which the infection is far stronger than at first. But anyone who, without such preparation, is suddenly called on to attend a patient in the last stages of consumption must see to it that every possible precaution is taken, for the risk is great.

These are the principles on which your missionary campaign depends. I have explained them at length in order that you may understand the reason of the rules given for applying them. I will presently explain these rules. But, first, let me say this. The fact that it may be impossible to carry out all the precautions given may make people think it is not worth while trying to carry them out at all. That is a complete mistake. It would be as wrong as to say that you would not try to educate your children as well as you can because you cannot educate them quite perfectly. *Every precaution you do take counts for something; it increases the prospect of the patient's recovery, and it decreases the risk of spreading the infection to others. Therefore do all you can.*

THE FIRST LINE OF DEFENCE—PRECAUTIONS TO BE TAKEN
BY THE PATIENT HIMSELF.

Precaution 1.—He should never spit except into something which can be burned at once, such as paper, or into a vessel which can be thoroughly disinfected after the phlegm has been emptied into the fire. When a patient is out of doors the regular glass or metal spittoon sold for the purpose is the best to use. Some people object to use it. If they refuse to, the next best thing is to spit into the handkerchief. But in that case the handkerchief should be disinfected immediately on reaching home by putting it in boiling water for as long as thirty minutes, because phlegm is very difficult to disinfect—it takes longer than anything else. Also it is very important that the handkerchief should not be put into the pocket, but into a bag specially kept for the purpose. For if it is kept in the pocket the germs from it will be continually rubbing off on the sides of the pocket, which will become a regular poison carrier. But if it is put into a bag which is disinfected every week at least by being boiled for twenty minutes, then the danger is not nearly so great.

To spit on the floor or walls of a room is, without exception, the most dangerous thing a consumptive person can do. It will almost certainly help to kill him, and it will infect anyone who is much in the room. Especially children, who crawl about on the floor of the room, are likely to get tuberculous sores in the joints. To spit on the floor of a railway carriage, or in a public-house, or any such place, or even in the street, is the very way to infect other people. For instance, a consumptive spits on the floor of a railway carriage. The phlegm dries and gets rubbed into the dust as people walk on it. Then a boy drops his apple on the floor, and eats it after rubbing off the dust, as he thinks. But a speck of such dust may contain thousands of the germs, and even if all the rest be rubbed off the tubercle germs may stick to the apple, and so he gets consumption of the bowels—a most serious and fatal disease—or

the germs may pass from the bowels and finally lodge in the lungs.

To spit in a cow-shed is an almost certain way to infect the cows, and then their milk will most likely infect some one else.

Precaution 2.—A consumptive should not swallow what he coughs up. For that is the way to infect some other part of his own body, and thus to greatly increase his disease. And even if he is able to resist a fresh attack of tubercles in some other part of his body, that can only be because his white corpuscles have beaten the tubercle germs in this new attack. But that must take off from the forces they can apply to the cure of the lungs. As to a tuberculous sore, the surrounding parts must be kept exceedingly clean with a disinfectant, and all rags, &c., coming from it should be burned.

While the spit and the pus contain the greatest concentration of infection, and are, therefore, the most generally dangerous, the tiny droplets which are scattered when coughing or sneezing are, perhaps, even more dangerous to the nurse and to the patient himself than the tuberculosis dust in the room. Hence

Precaution 3.—He should never cough or sneeze without holding something in front of his mouth—either a handkerchief or a piece of paper, which he burns at once. If he uses a handkerchief it should be boiled. In this case twenty minutes is sufficient, unless there is phlegm on it, when it should be boiled for thirty minutes as before. Also it should be kept in a bag or removable pocket, which can also be disinfected.

Of course, the object of this precaution is to prevent the germs, which are always scattered about when a consumptive coughs or sneezes, from being spread through the air, and either being breathed back into the lungs of the patient or his nurse, or else settling on the floor, or walls, or furniture, and so adding to the general infection of the room. The handkerchief prevents this. but, of course, it does not kill the germs.

Handkerchiefs used by a consumptive should never be shaken about in a room, for that is the very way to

spread the tuberculous dust which is sure to have dried on them.

It has been already pointed out that open windows and doors and free ventilation are of the *utmost importance* in regard to this danger. Hence, also,

Precaution 4.—He must live as much as possible in the open air. Draughts, which are bad for an ordinary cold, are part of the cure of consumption. This is partly because they keep the air and room in which he lives from getting choked up with the germs, and so give him a chance to conquer those which have got in. In sanatoria the beds are put between the window and the door, and both are kept open.

Precaution 5.—The cast-off clothes of a consumptive should never be worn by anyone else unless they have been thoroughly disinfected. Boiling for thirty minutes is enough.

Precaution 6.—If a man, he should not wear beard or moustache, for if he wears either it will be quite impossible for him to keep it from getting infected whenever he coughs. Then the infectious matter will dry, and every time he breathes *out* he will scatter some of the germs into the air around him for other people to breathe. Every time he breathes *in* he will get more germs into his own body.

Precaution 7.—He should not fondle or caress others, nor should they ask him to do so. It is quite certain that no consumptive can keep his face, hands, or clothes quite free from infection, and, therefore, all unnecessary contact with him should be avoided. Especially children should be kept from anything of this kind.

Of all these precautions the last is the only one which is not just as important for the cure of the consumptive himself as for the protection of those who are with him.

THE SECOND LINE OF DEFENCE—PRECAUTIONS TO BE TAKEN BY THE NURSE.

Even where the greatest attention is paid by the nurse and patient to the precautions I have explained great numbers of the germs will inevitably escape and settle

on the clothes, floor, furniture, walls, &c., as fine dust. If the room be not regularly disinfected, it and everything in it will soon become filled with tuberculous dust. Thus the second line of defence depends on our means of killing the germs in this tuberculous dust. For this we have to rely on disinfectants. The choice of the proper disinfectant is, therefore, a matter of the utmost importance. Many things are sold as disinfectants which are not germ-killers at all, and which, therefore, ought not to be called disinfectants. For instance, experiments made by the officers of the London County Council show that Condy's fluid does *not* kill the germs of infectious diseases (though it prevents smell most effectually). They also show that the vapour of formalin, properly burned in a room, kills tubercle germs lying on walls or wooden floors fully exposed to it, but that it does *not* kill the germs in clothes. Drs. Rideal and Walker have experimented with cyllin—commonly known as “Jeyes' Fluid”—and find it a thoroughly satisfactory liquid germ-killer, twenty times more effective than carbolic acid, and non-poisonous. One teaspoonful to a pint, or one tablespoonful to a half gallon of water, is the proper strength. Corrosive sublimate solution—one ounce to a gallon of water—is also an effective germ-killer, but it is a deadly poison also.

I have no brief in favour of any special disinfectant. Use any that has an independent scientific guarantee, but put no faith in the glowing accounts given by the proprietors, *nor in any anonymous testimonials*.

The best way to kill the tubercle germs—or, indeed, any others—in a room is, first, to remove the patient from it, and then damp the floor thoroughly with disinfectant—say, Jeyes' Fluid, one tablespoonful to half a gallon of hot water. If there is much dust it may be necessary to use plenty of damp sawdust or tea leaves first of all, so as to avoid raising the dust, which is just concentrated poison, and only go over the floor with the disinfectant after they have been very carefully swept up *and burned*—burned, for if thrown out and allowed to

dry without killing the germs the spot where they are left becomes a concentrated centre of most dangerous infection. If there has been spitting on the floor or walls it should be thoroughly soaked with disinfectant, so as to soften it, kill the germs, and make it easy to remove. When that has been done, formalin tablets (to be purchased at any chemist's) should be burnt in the room, as directed by the Formalin Hygienic Company, and afterwards, when the room is opened, the spit, now softened with disinfectant, should be scraped off the floor and walls. Then the loose articles of furniture should be taken into the open air and dusted with a cloth soaked in disinfectant. Next, the floor should be kept well scrubbed with soap and hot water in which the disinfectant is mixed in the proper proportions. The reason for the scrubbing is that it rubs the germs off the floor, and the reason for using the disinfectant is, first, that the water with which the floor is scrubbed may be made harmless, and, second, that the germs which remain on the damp floor after it had been dried off with the cloth may be killed before they get dry again. Therefore, it is better not to dry the floor until twenty minutes after the washing, so as to give time for the disinfectant to kill the germs.

The whole of this process has to take ten or eleven hours, and then the floor has to dry. If the patient cannot be removed from the room the only difference is that, instead of using the formalin vapour, the walls must be rubbed down thoroughly with a cloth soaked in the liquid disinfectant, and, to make all safe, they should not be allowed to dry for at least twenty minutes.

The disinfection of an earthen floor is a matter of some difficulty, for it is hard to dry it afterwards. Wet it with the disinfectant, and scrape or rub off the top surface, especially if there is any spit on it, and then put fresh sand on it.

This precaution of disinfecting the room at regular intervals is, I think, hardly ever insisted on by the doctors. It is only after the patient is dead that they make a strong point of the absolute necessity of dis-

infection. Yet the room must be filled with deadly material long before the death—it is not that after death there is a great escape of germs. As a matter of fact, none at all escape after death. Probably the real reason why the doctors do not insist on it is that they find it impossible to get people to take pains of that kind—they feel that it is wiser only to advise people to do things they are ready to do than to drive them faster than they will go. It is easier to get them to spend thousands on sanatoria than to take a little trouble every day. Yet there can be no doubt that a general adoption of the precautions of disinfection by patients and their attendants would do infinitely more to save people from the disease, and to cure those who already have it, than all the sanatoria which there is any possibility of building. How can we get sanatoria to contain the 60,000 people who have consumption in Ireland, or even the 12,000 who die every year? Yet all, or nearly all, could be helped to take at least the most important precautions.

There are several most important points about the room in which a consumptive person lives.

First. He should live in a separate room from the rest of the household. Choose the room which can be best aired and with least risk of infecting the rest of the house. A room with windows in different walls is the best. If that should be impossible—and *unless it is absolutely impossible it should always be insisted on*—it is certain that he must sleep in a separate bed; for anyone who should continue to occupy the same bed with him would have but a very small chance of escape.

Second. There should be no carpets or curtains to keep the dust in. The furniture should not prevent the air from getting to the corners and the walls all round the room. In especial, the bed itself should, if possible, be so placed that a person can pass round it without the dress touching the walls (this is not only for air, but because germs always get on the walls, and if the dress rubs against them it is sure to brush them off and send them floating through the room). Again, the bed should be placed in the airiest part of the room—if

possible, between the door and the window, and these should be kept open, so that there should be a thorough draught, as that will carry away the germs when the patient coughs, and will also supply a constant stream of fresh air to help to heal the patient's lungs. The beds are so placed in the great Consumptive Hospital at Newcastle, in County Wicklow.

As to the walls themselves, if there is a choice they ought to have a hard, dry surface, which can be easily disinfected by rubbing it down with a cloth which has been soaked in some disinfectant which has been thoroughly tested. If the paper on them is washable it will do well, but if not it should be rubbed off after it has been thoroughly soaked with the disinfectant, and then it should be burned.

As for the floor, the best thing is either to paint it or stain it, or else to cover it with oilcloth of any kind, so that it can be quite easily cleaned. But, of course, the floor must be thoroughly disinfected first. The room should never be swept out unless the dust has been thoroughly laid. The floor should be gone over with a damp cloth instead, so as not to raise the dust.

Separate cups, tumbler, spoon, knife, fork, plate, &c., should be kept for the patient, and no other member of the household should use them. Also separate towels, linen, &c., of all kinds. None of these things should be washed with the rest of the household things.

Great care should be taken that *none* of the food in the house should become infected, as it must do if tuberculous dust be allowed to settle on it.

Disposal of Slops, &c.—The attendant must remember that all the water used for washing infected articles is itself infected, and that if allowed to dry before the germs it contains are killed it will become a source of extreme danger—all the germs which have been removed from the room will be gathered together in the spot where the water has dried.

There are, therefore, two ways of treating it. The best is to kill the germs by boiling the water for twenty minutes *after* the washing-up has been done, or to dis-

infect it in some other way, and then to carefully pour it down a drain, or else to pour it down the drain first, being careful not to make splashes, and then to rinse the drain out with water, or, better still, with a disinfectant, so as to wash down the germs which have not gone down the drain with the first pouring.

None of the infected linen, &c., should ever be removed except in a vessel with the disinfectant in the above proportions or else after being boiled for twenty minutes. If sent to the wash without that being done, the washerwoman may get infected, and so may others who use the laundry. The making of the bed should be done when there is as much current of air in the room as possible. For there is sure to be a lot of poisonous dust on the pillow and the part of the bedclothes near where the patient breathes. This dust is very light, and, therefore, more easily stirred about than the heavy dust of the floor, and it stays floating about in the air for a much longer time, and is, therefore, more likely to be breathed in by anyone in the room. Those who have time and opportunity may reduce this source of infection as far as possible by pinning a removable slip of linen over the pillow and disinfecting it each morning with the patient's handkerchief.

A constant current of fresh air in the room is, however, the chief protection against this, for it is constantly removing the tuberculous dust little by little.

PERSONAL PRECAUTIONS TO BE TAKEN BY THE ATTENDANT.

First. Breathe through the nose. This is especially important when dusting, making the bed, &c., or when the patient is coughing. Turn the head away when the patient coughs or sneezes.

The passages of the nose are arranged so as to prevent even the tiny germs from getting into the lungs at all as much as if the breath goes straight in by the mouth. Therefore, it is especially important to breathe through the nose when doing anything which stirs up the germ-laden dust.

Second. Never wear a long dress, for it will stir up

the dust as it sweeps the floor, and that is the worst thing for nurse and patient. Wear a glossy apron, and avoid clothes which will catch and hold the dust; shake and brush the clothes well in the open air. No one with a long dress should go into the room. The dress should always be so short that it is well above the floor. If not, it is quite sure to catch up a good deal of dust in the under-garments, which may carry the infection anywhere, and especially to the person herself.

Third. Never do the washing-up or scrubbing of floors, or dusting or making-up of the bed, &c., if the skin of the hands be broken or chapped, except after tying the injured part closely round with a rag well soaked in extra strong Jeyes' disinfectant or some other non-poisonous germ-killer. For if not the germs may enter at the broken part and give rise to disease either at that spot or elsewhere.

Now let me come to the next matter. Before you can expect anyone to take even the most important of the precautions I have explained you must convince them that the measures you advocate are really effective. Perhaps the chief difficulty is that people believe that consumption is a thing that runs in families—that it is hereditary, or, at least, that the tendency to take it is hereditary, so that those who have that tendency cannot escape it, while those who have no such hereditary tendency are very unlikely to take it. The result is that they do not think the precautions are any real use. In reply to this objection let me give you some cases from the exhaustive Report of the Edinburgh Public Health Committee, which are more convincing than any mere theorising :—

“In 1896 a young lady of twenty-six fell ill of consumptive blood-spitting. The father had died of consumption in 1879; the mother of tuberculous inflammation of the brain in 1882; two adult sisters had died of consumption in 1882 and 1884; the third sister and four of the five brothers fell ill of consumption, with blood-spitting, in the years 1883, 1885, 1889, and 1890. Except two children, who had died in infancy of other

diseases, and one son who escaped, the parents and all the offspring were thus tuberculous. *Some years ago everyone would have said that this was a case either of inherited consumption or of conspicuous inherited predisposition.* But, when examined, it was found that up to 1870, when the father became infected, no member of the family had ever shown symptoms of tubercle. The grandparents on both sides were healthy; the father had four brothers and two sisters, who had between them twenty-eight children; the mother had four sisters, with twenty-four children. *None of these relatives ever contracted tubercle disease.* When to that fact it is added that the son who did not get the disease left home in 1880, one year after the father's death, it becomes clear that the case was one of the infection of a healthy family, living together continuously as they did in one house, due to the germs originally generated in the father's system, he having been infected from some unknown source."

"The history of a particular dwelling in a large Artisans' Dwellings Building was traced, because it seemed a nest of consumption. From 1865, when it was built, to 1874, it was inhabited by three families, all healthy. In 1874 a family, in which the mother was already consumptive, entered it. The woman died in the house, and after a year's tenancy the family left. The next occupants were a family of seven persons, all healthy. They left after a year's occupation, and at a subsequent date it was found that the father, mother, and one son died of consumption of the lungs, and a fine boy of consumption of the bowels. The next family were healthy on arrival. A child born in the house died of tuberculous inflammation of the brain; later the father died of consumption, and another child of brain inflammation, another contracted hip disease, a sister became extremely scrofulous, and the mother became consumptive. A fourth family came in after this, all healthy; the mother became consumptive, and two children died of tubercular inflammation of the brain.

"During all this period the dwelling in question was

never vacant; each new tenant entered it while it was still warm from the previous one, and it was never painted or cleaned out. It is stated in the same large house that there were many other dwellings in which this neglect did not occur, and that there was no other similar instance of tubercular disease clinging to the apartments."

What a terrible death-trap a room may become if it is not properly disinfected may also be judged from the following case which occurred in my own neighbourhood:—

A village carpenter, in good work, living in a detached, healthy cottage, had a family of three sons and two daughters, all most well-conducted and sober. The two eldest shared an attic room. The eldest died of consumption when about twenty-three. The second died of it a year or two after. The room was then unoccupied until the third son grew up, when he moved up into it. In a short time he also fell into consumption, and died after two or three years' illness. The attic was then unused for a considerable time. Finally, the son of one of the daughters—a boy about ten—came to live with his grandparents. At that time, or perhaps two or three years after, he was given the attic to sleep in. When he was seventeen or so he also fell into consumption and died. None of those who lived downstairs took the disease. The old father and mother were strong, healthy people, and lived to old age, and neither of the daughters was consumptive.

Observe that only those who lived in the infected room got consumption. Had it been properly kept the eldest son might have recovered, and it is practically certain none of the others would have died.

Even an office used by a consumptive person in the daytime only gave the infection to twenty-one others who came after, but when properly disinfected no one else got it. In another case, known to a friend of mine, there was a family of four. The two elder were with a governess, the two younger with a nurse. The baby

girl died of tubercular meningitis. It was then found that the nurse, who had been with them several months, was consumptive. About two years after she had left the little boy developed hip disease. The elder children, who had been with the governess, remained quite healthy.

Again, the infection in regard to ten infants attended by her was traced to a midwife far gone in consumption, whose improper habit it was to blow down the lungs of newly-born infants.

On the other hand, statistics in German orphan houses have shown that the infant children of parents who have died of consumption grow up without more liability to the disease than other children. And Koch and numerous other German observers have shown that the offspring of animals infected by tubercle develop as vigorously as those of healthy animals if they are shielded from infection.

These cases seem to me to give an absolutely convincing answer to those who think that hereditary predisposition is the most important factor in producing consumption. On the one hand, they show clearly that where the infection is strong, and no precautions are taken, very few people escape. On the other hand, they show with equal clearness that there is comparatively little risk where the infection is not strong, because in most of these cases the others who were living in the same house, but not in very close contact with the patient, did not get the disease. But it would not do to place too much reliance on this, for there are many other cases in which the infection was spread over the whole house.

Then, again, and especially among the poorer people, I have met fatalists, who said that it was by the will of God that they got consumption, and that it was useless to fight against His will, if it was that they should die. Of course, you may say everything is the will of God, but it is no more the will of God that people should be afflicted with consumption than that men should commit

crime. Tuberculosis is the result of human carelessness, and could be, and ought to be, prevented. For observe, though the tubercle germ can remain living in dust, it can only *multiply* when it has got into someone's body. Therefore, infection means that the very same individual germs which were coughed out or otherwise expelled from one person's body get into another person's body. If every consumptive, or the person in charge of him, were to take care to destroy the germs which he now ignorantly or carelessly scatters about, there would be no fresh cases of infection. Thus, in every case of death from tuberculosis a coroner's jury would be justified in bringing in a verdict of "MANSLAUGHTER BY SOME PERSON OR PERSONS UNKNOWN." And there are about 12,000 such deaths in Ireland every year. There are many consumptives who, through ignorance or carelessness, spit out their phlegm in private or public rooms, not remembering that, weight for weight, coughed-up phlegm is more than ten times as deadly as the lead fired in the Boer War.

What I have said is, perhaps, open to criticism. It is not strictly true that every case of tubercle is a case of direct infection from a human subject. For it is now known that tubercle in cattle can give rise to tubercle in man, and that this often occurs through the milk of infected cows.* Yet the criticism is not as conclusive as it seems, since tuberculosis in cattle is due to human infection. Wild cattle are not tuberculous. Moreover, if once human infection were controlled, there would be no difficulty in dealing with the cattle.

Can you conceive a stronger case for taking precaution than has already been presented? Yet only half the argument has yet been given. For our precautions

* The recent advances in the subject seem to indicate that infection by milk is a much more important source of consumption of the lungs than was thought probable some years ago. Hence the proper sanitation of the dairy, the testing of the cows for tubercular disease, are being recognised as more and more important, and where that cannot be secured, the milk should be sterilised either by being boiled for a quarter of an hour, or, better still, by being Pasteurised. The doctor or nurse will explain how this is to be done.

are just as necessary for the cure of the patient as for the safety of those around him. We have learned now that our only hope of curing consumption is to assist nature—that the white corpuscles are our only hope. It is they, and they only, which can destroy the tubercle germ. All that the sanatoria or any form of treatment can do is to give the white corpuscles a fair chance to get at and fight their enemy.

Once you realise this—that no chemicals, no food, no treatment of any kind, can of itself cure the patient; that the question of life or death is neither more nor less than this—will the white corpuscles succeed in eating up tubercle bacilli or not?—why, then, the proper treatment is clear. You have no longer any difficulty in seeing why the patient who lives in a room never disinfected, who breathes air loaded with the germs, who swallows them with his food, can make no fight against the disease; while the same man, placed in a sanatorium, where everything is kept as free as possible from fresh germs, rapidly improves. What chance had his white corpuscles in the infected room? They were never left free to fight the old disease. Every day, every hour, they were being called off to fight the new tubercle germs entering the part of the lungs with which the patient is breathing—that is, the healthy part—or entering the stomach with his food, and so upsetting its functions that nothing agreed with him. Without thorough disinfection the white corpuscles have no fair chance.

I do not mean to say that this is the only advantage of the sanatoria over the home. There are certainly others, but this is the greatest of all. That the disinfection be complete is even more necessary for the patient's recovery than for the safety of his attendants. For while every fresh dose of infection, no matter how slight, is a disadvantage to him, *very* slight doses are a decided advantage to his attendant. This is because of that fortunate property of the serum, already explained, in virtue of which slight struggles with the invading germs increase its efficiency. It furnishes a complete answer to

those who say that since it is evidently impossible to get rid of *all* the infection, it is not worth while to do anything. On the contrary, if you can reduce the infection to about the amount in a hospital for consumption you actually lessen the chance of those living in the house getting consumption from any source of infection.

If you are to be missionaries you will have to make up your minds on questions of the duty of public departments in this matter. On those who are going to the country districts I would especially urge the humble claims of the village home, rather than the County Council sanatorium. There are many others who will do that. Sanatoria do a splendid work as far as it goes, but what of the thousands who can never hope to be admitted to them? Let me urge the far more useful work of the home and the village.

The most important of all measures in the prevention of consumption is the provision in each village or town of small retreats where the dying consumptive could be treated, so that he would no longer be a source of danger to others. For in the last stages, when the infection is most dangerous, the patient himself has no strength to do his part, and if he be in a small cottage with his children about him, it may be all but impossible for his wife to keep the children free from the infection. There can be little doubt that it is from those who are in the later stages that the most part of the infection of the healthy arises.

One of the best of all the exhibits in the Exhibition is the revolving shelter which a country doctor made for himself when he had consumption, and by the help of which he cured himself. He made a large box of light timber. It was six feet square and about seven feet high, with one side nearly removed, so as to make an entrance. Then on the under side of the floor he fastened a cart wheel. Then he fixed the axle of the cart wheel into the ground, so that when the box was lifted up and the wheel put on the axle, the box was free to turn round a few inches above the ground. In that

little house he lived during the daytime. Some consumptives even sleep in such little houses, and cure themselves in that way. The reason of putting the house on the cart wheel is that it may be turned round so as always to face the sun or to be sheltered from the wind. This is a thing that every village in the country might easily have.

But you have another part beside that of missionary to the people among whom you are placed. To you is confided the education of the young, and one of the questions I am expected especially to deal with is how children can be educated so as to aid in this campaign against tuberculosis. I am not sure whether on this matter I shall altogether satisfy some of those who listen to me. I think there ought to be very little said to young children as to the risks they run of getting fatal diseases. I think the endeavour ought to be to train them up in sanitary *habits* rather than in thinking about sanitation. Before coming here to-day I looked through two papers. One was the Syllabus of the Simple Lessons on Health and Habits, and for it I have nothing but praise, if it is judiciously used. The other is the placard about consumption, issued by the Association for the Prevention of Tuberculosis, and posted in the schools by the authority of the Commissioners. For it I, as a member of the committee, must accept some measure of responsibility. Yet, when I read it over, I felt that it was most unsuitable. It states that the children of consumptive parents are especially liable to take the disease, because they are not so strong as other children, and that, being exposed to infection from parents, they may get the disease into their system, though it may not show itself for many years. And, again, it says—"Never, under any circumstances, spend more than fifteen minutes in a room with a consumptive person, unless at least one window or the door of the room is open. Even then let your stay be brief."

Even for the parents it seems to me that the last statement is injudicious, because it may be most neces-

sary to spend more than fifteen minutes as described, and if the room is properly kept, and the patient is not coughing, the danger is probably very slight. And if you have to attend to the wants of the consumptive it is impossible that your stay shall be brief when the window and door are open. Nor is there any reason to apprehend danger. The nurses in a consumptive hospital are there all day, and they do not get consumption.

But even if the placard did not err on the side of counselling too much precaution, it seems to me cruel to tell these things to the children, who cannot control the household. What will happen if, living with a consumptive patient who does not obey these rules of open windows, they are forced to remain in the rooms with him? Either they will get callous, and all advice about health will fall on deaf ears, or else they may suffer mental torture as they fancy themselves doomed. In the first case we do no good, and though we do no immediate harm either we make it unlikely that they will pay any attention to sanitary precautions as they grow up. In the second case we may do irremediable mischief. Such fancies, coming at that sensitive age, may upset the mental balance, and cannot fail to weaken the power of resistance to the infection.

With the children, then, I think the proper course is this—practice them in good habits, and don't forget to explain why they are healthy, manly, and so on. Try especially to get those boys and girls who are naturally the leaders of the others to take a pride in health and vigour and healthy ways; give them all the joy you can in life, and they will be the better able to meet its difficulties at a later stage. And see that you yourself set a good example. Think how you can best obey sanitary rules yourself. For instance, when the class is singing, the air should be as pure as possible, for then the children breathe deeply, and the strong currents of air are more likely to carry the germs past the little hairs that line the passages of the lungs, and thus to lead to infection. This is still more important during gymnastic

exercises, which ought, if possible, always to be done in the open air, but if done in school have the windows open. For the children to see that you think such precautions important, and that you always attend to them yourself, is far better than any set exposition. And, happily, it is easy to point out the road by which you can help the children under your care to make a good fight against tubercular infection in whatever form and at whatever period of life it may attack them. The rule is simple—help them to be healthy children. You have no need to trouble about the future—try to order their lives so that all that is done now makes for greater vigour—create a public spirit against unhealthy or precocious habits, which sap the constitution. For instance, the schoolmaster who can get his boys to think it bad form to smoke will probably do much to save them from consumption. In the far-reaching character of its results there is, perhaps, nothing which it is more important to check than this habit of juvenile smoking. That is the best advice I dare to give. Get your pupils to love the open air, to sleep with windows open, and to love those things which are clean and pure. Give them physical, as well as moral, self-respect, and you will do better for them, at their tender years than if you give them the knowledge of good and evil.

MR. BIRRELL, in bringing the meeting to a close, said : It has afforded me great pleasure to be present at Mr. Culverwell's lecture. I hope what he said will sink into your hearts, and that you will all be both missionaries and instructors with regard to this terrible plague. It is preventable. It is known to be preventable. Scientific men are fully alive to all these facts, and all that is required is instruction, light, and leading for the people at large. And surely we may look to the teachers of Ireland, who, I trust, are deserving of the high praise that has been bestowed upon them this afternoon. If you are you will realise the great responsibilities that are cast upon you to teach the principles of health to the

children under your charge. With regard to other subjects affecting teachers which have been brought forward this afternoon, I can only say for myself that the Government with which I am connected have already done something towards providing funds towards making your primary schools in a fit and decent condition to carry on the great work of education. Something has already been done in that and in one or two other directions. With regard to the larger question, I will only say that you must have a little patience; but I think you will find in the estimates of next year that some provision at all events on a more suitable and generous scale is to be provided for the salaries of teachers. At all events, I will do my best to fulfil the promises that I fully admit I have already made in that direction. I can only again say that I have been very glad to be here this afternoon, and that I hope the lecture to which you have listened will prove fruitful of much good in years to come

SUMMARY OF STATISTICS ON TUBERCULOSIS IN IRELAND

Extract from an Official Report Prepared by the Local
Government Board of Ireland for the International
Tuberculosis Congress at Washington, 1908.

“ WE have now dealt with the main features of the tubercular death-rate as disclosed in the Registrar-General's statistics and compared the state of things at periods since 1871 under the headings of age and sex, and urban and rural conditions. The analysis of the figures shows the increase and decrease since 1871, the age and sex periods most affected, the urban and rural incidence of the disease, and it is demonstrated under each of these headings where and to what extent Ireland differs from England and Scotland.

We have found :—

- (1) That the tubercular death-rate in Ireland is very high when compared with England and Scotland, and that whilst the tendency in England and Scotland has been towards a marked improvement, the opposite has been the case in Ireland.
- (2) That in the ages between 10-45 years, Ireland has an excessive death-rate from tuberculous disease as compared with England and Scotland.
- (3) That in the earlier years of school life and adolescence, the female tubercular death-rate is

strikingly excessive in Ireland when compared with England and Scotland.*

- (4) That the town tubercular death-rates in Ireland compare unfavourably with the town tubercular death-rates in England and Scotland.
- (5) That the town tubercular death-rates in Ireland compare unfavourably with rural tubercular death-rates in Ireland, as proportionately a much wider gap exists between urban and rural tubercular rates in Ireland than in either England or Scotland.
- (6) That Table No. XXXII. shows the effect of tuberculosis upon the general death-rate and brings out the fact that our excessive general death-rate is due to tuberculous disease.

* A consideration of the sex incidence of the disease in the three countries shows that in Ireland the female death-rate begins in the age period 5-10, for the first time, to exceed the male. In comparing the two periods, 1871-1880 and 1901-1905, it will be seen that England and Scotland have effected considerable reductions in the female death-rates, whereas in Ireland the rates have increased. In the next period, 10-15 years of age, we have a similar movement, save that, in Ireland, the female death-rate is now nearly twice as high as the male, and this movement continues up to 20 years of age; the change then comes, and in the age period (25-35), the male death-rate exceeds the female. What may be the precise significance or explanation of the greater female incidence of Tuberculosis in Ireland at these periods of life is a matter for conjecture; the figures, however, show us, both as regards the ages and sexes, the points at which the excessive death-rate occurs. The predisposition of Tuberculosis to attack, or rather to show itself, in the developed lung is a recognised fact, and, as females develop more rapidly than males, we have an explanation of the excessive incidence of Tuberculosis in the female, but this does not explain the very much greater incidence of the disease between the ages of 10 and 45 in females in Ireland, as compared with females in England and Scotland. Possibly, it may be that the ill-nourished female child in Ireland is exposed to greater risks of infection, and lives, both in the school and in the home, in more insanitary surroundings than she does in England or Scotland. The tubercular death-rates in Ireland, for both males and females, show a great excess over those in England and Scotland for the age periods (5-15), but this excess is most marked amongst females. The lesson to be learned seems to point to careful medical examination of all school children, but particularly of girls, from the very earliest school ages. Good school hygiene, with better food, shorter hours for very young children, and attention to the development of chest muscles and lung capacity appear to be the remedies which should be applied in the case of both sexes, but particularly in the case of young girls between 5 and 10 years of age.

COMMENTS OF FACTS AND STATISTICS.

“ We have now shown precisely where the excessive tubercular death-rate in Ireland occurs. We have located the excessive incidence of the disease in Ireland in the periods between about ten and thirty-five years of age, in the female sex for most of this age period, and in the town districts. We have also been able to follow the gradual advance of the tubercular death-rate since the year 1871, and have marked its increased mortality in Ireland concurrently with its large and steady decrease in England and Scotland. In the earlier portion of this report it was shown that during this period, 1871-1905, there was a marked improvement in the conditions under which the people of Ireland live. The housing of the people has improved beyond all recognition as compared with the forties and fifties of the last century, the density of the population has been largely reduced, wages have increased, the material resources of the people and their standard of living have improved (with regard to food, there was some reservation, for whilst the people, it was found, lived much more expensively, it was doubtful whether they fed better from the point of view of health). Subject to this possible reservation, there had been a distinct and marked improvement in all the other economic circumstances which it could be supposed would have a favourable influence upon the health of the people. Yet, side by side with this improvement and coincident also with a marked reduction in the general mortality, and a large reduction in the mortality from zymotic diseases, and the practical abolition of the great plague of typhus fever, we have had to record an increase, instead of a diminution, in the death-rate from tuberculosis. The material question for us to ask ourselves, now that we have all these facts and figures before us, is what the cause of the excessive death-rate from this disease is in Ireland. In order to answer this question, we propose again to review some of the principal predisposing causes dealt with in Part I.,

and ask ourselves whether, in view of our knowledge of the facts, any of these causes can be said to be specially responsible for the increased mortality which is so noticeable in the Irish returns of the last few decades. For example,

HOUSING.

Is this increase due to the housing of our people? Let us take Dublin, which, as we have already shown, is a city of one-room tenement houses, as compared with Belfast, that new city with about the smallest percentage of one-room tenements in the three countries; Dublin is an old and poor city with, comparatively, little employment for the labouring classes; Belfast is a modern and a rich city, with abundant industrial occupation for its people. No doubt, the death-rate from tuberculosis and also the general death-rate is, as would be expected, under these conditions, higher in Dublin than in Belfast. But, if we compare Belfast with Waterford and Limerick, or with the English and Scotch towns, we find that, notwithstanding the prosperity and good housing of the people of Belfast as compared with almost any town in the Kingdom, and notwithstanding the comparative poverty and bad housing of Waterford and Limerick, the death-rate from tuberculosis in Belfast is higher than in Waterford or Limerick, and nearly twice as high as in most of the English and Scotch towns. It may be that the combination of poverty and over-crowding in single room tenements in Dublin accounts for the excess of tuberculosis in Dublin as compared with Belfast, but it cannot be said that it is the superior housing in Waterford and Limerick that secures for these towns a lower tubercular death-rate, any more than we can say that the wretched cabins of Mayo and Galway are responsible for the comparative immunity of the people of these districts. Bad housing and poverty, no doubt, play their part, as is shown by comparing a city like Dublin with Belfast, but they do not explain away the whole of the increased tubercular death-rate in the rest of Ireland, nor

do they explain the high rate in the well-housed city of Belfast compared with English and Scotch towns,

It has already been shown that in Ireland, taken as a whole, there has been quite an extraordinary improvement in the housing of the people, the Registrar-General's paper, to which we have already referred, and the other evidence of improvement, make this abundantly clear; we cannot, therefore, conclude that the excess in Ireland, and also the increased death-rate in recent years from tuberculosis, are due to worse conditions of housing than existed formerly.

FOOD.

Again, is the increase due to bad and insufficient food? Food, no doubt, plays its part: the ill-nourished, underfed man or woman is exposed to greater risk of contracting disease. At the same time, if we look at the 'dietaries already submitted, we see that in Mayo and Galway the standard of living is as low as it can well be, and yet the tubercular death-rate is not only lower in Mayo and Galway (all forms of tuberculosis, Galway 1.8 per 1,000, Mayo 1.5 per 1,000) than in any other part of Ireland, but also is about half that of Belfast, a town of good wages in which the labouring classes live probably better than in any other part of Ireland. Whilst, therefore, food has, no doubt, its influence upon the tubercular death-rate, we cannot, with these facts before us, affirm that food, any more than we can say that housing, plays the predominant part in determining the excessive and increased death-rate from the disease.

SANITATION.

Is it due to bad sanitation?

Again, we have no evidence that this is so: on the contrary, although Ireland as a whole cannot be described as realising even a moderately high standard of sanitation, still it has improved in this respect enormously within the last thirty years; yet this is precisely

the period in which tuberculosis has increased, and although here again we recognise the importance of good housing and good food, we cannot say that our largely increased death-rate is due to bad sanitation any more than it is due to the other causes mentioned. The improvements in housing, wages, and sanitation, to which we have already referred, must have exercised a beneficial effect in reducing the tubercular death-rate, just as they have helped to reduce the general death-rate, and they would unquestionably have demonstrated their effect upon the tubercular death-rate had it not been for some more powerful agency which has counteracted the good effects of these great sanitary and social reforms.

THE SCHOOL INCIDENCE.

There is good reason to look with suspicion on the school incidence of the disease, from the fact that in the school age the first signs of an increased death-rate are apparent. From our knowledge of the sanitary conditions of many of the primary schools in Ireland, we are inclined to think that the compulsory attendance of children at school has probably not been attended with good results, so far as their health is concerned. The crowding of large numbers of young children at a susceptible age into badly-ventilated schools, and retaining them there for long hours, without suitable breaks for recreation, and without any attempt to develop their bodies by physical drill and exercises, and, in fact, the devotion of attention exclusively to the children's brains whilst disregarding their bodily health, has had, on the whole, we think, particularly in an under-fed, badly-clothed population, such as we have in Ireland, a bad effect upon the young people of our race. The tendency of tubercle to become latent and develop at a considerable interval after the original infection must be remembered, as it may possibly account for much of the tubercular disease developed after the school age. We look, therefore, upon the primary schools as a possible medium for fostering and spreading this disease.

EMIGRATION.

In the first portion of the report we dealt with emigration. The effects of emigration upon the tubercular death-rate are difficult to calculate. It has been shown that 84 per cent. of the emigrants from Ireland leave their country between the ages of fifteen and thirty-five. The withdrawal from the population of this age period of so large a number of people at the most susceptible age, so far as tuberculosis is concerned, might at first sight seem to be a factor in favour of a reduction in the mortality statistics from this disease. This, no doubt, would be the effect if it could be maintained that the persons who emigrated were selected from the least fit, or that had they remained at home they could not be maintained in a condition of physical efficiency. Then emigration might be regarded, from a public health point of view, as a useful safety valve. If, however, we can maintain our people at home and feed and house them in such conditions as to make them efficient men and women, then the loss of such a large number of healthy young men and young women in the ages between fifteen and thirty-five years is a severe drain upon the resources of the country, and if that withdrawal is from amongst the best of our labouring classes, the effect would be to deteriorate the race which remains at home, and which would be continued by procreation from the least fit.

On the other hand, with regard to the increased tubercular death-rate, it may fairly be argued that if emigration has been the determining influence in inducing tuberculosis by deterioration of the race, it should equally affect the general death-rate. The country districts would also suffer more than the towns seeing that the greater portion of the emigration is from the rural districts. It will be remembered, however, that the general death-rate has been steadily reduced, and that the towns suffer more in proportion than the rural districts, and that in poor rural districts, such as Mayo and Galway, 1.2 per cent. of the population emigrate annually.

As from England and Scotland there has been no such

outpouring from the population as we have had in Ireland, we cannot, therefore, make any comparison between the three countries under this head. We can only surmise that the loss of the young by emigration from Ireland does not exercise a beneficial influence upon the race.

In passing, however, from the subject of emigration, we think that its precise effect upon the tubercular death-rate is one of the questions which is deserving of more minute investigation than we have been able to subject it to in this paper. The facts that the emigration age and the age of the greatest tubercular death-rate synchronise, and that it was not until the effect of emigration in depopulating the country became apparent that the tubercular death-rate in Ireland commenced to rise, are worth consideration. They can be verified by studying the incidence of the tubercular death-rates and comparing them with the statistics of emigration and depopulation as already set forth.

GENERAL CONCLUSIONS.

Leaving the effect of emigration as an unknown, or at least an undetermined, quantity, we may conclude that with regard to malnutrition, bad housing and insanitation, all of which are dependent largely upon economic causes, they have probably all had their effect in reducing the resisting power of the people. As malnutrition, bad housing, and insanitation, and all the other circumstances of poverty, were with us even in a more pronounced form long before the increase in the tubercular death-rate, it cannot, we think, be deduced from the facts before us that they have been the determining cause of the excessive death-rate from tuberculosis. No doubt all these factors have helped to prepare the ground for the reception of the seed, and so tilled and cultivated it that it was ready for the sowing which has yielded such a lethal crop in Ireland.

We have shown in Part I. the peculiarities of the Irish people with regard to the desire to die in their own

homes, and also their dislike to the only form of institution available—namely, the workhouse infirmaries—coupled with a system of poor law relief which brings medical assistance to their homes instead of bringing the sick to the infirmaries. We have drawn attention to the system of outdoor relief which has increased so enormously in Ireland during the period under review, and which also has had the effect of maintaining the poor at home. We have directed attention to all these peculiarities of the situation in Ireland, as we consider that these special conditions have favoured the spread of the disease by means of infection. So long as typhus fever was treated in the homes of the people without any attempt at isolation, as it was for many years in Ireland, it destroyed thousands of the population, and Ireland was subjected to constant devastating visitations of this disease. The establishment of fever hospitals in every union in Ireland after some time controlled the disease by means of the prompt removal to these institutions of the sufferers, thus separating the healthy from the sick. By this means, coupled with improved sanitation, typhus has been conquered. By similar means other zymotic diseases have been largely reduced in Ireland, until we now have the lowest zymotic death-rate in the three countries.

Tuberculosis we have not treated institutionally; on the contrary, as has been pointed out by Dr. Newsholme in the quotations already made from his papers, we retain our consumptive patients a shorter time in our workhouse infirmaries than is the practice in England, and our people, in the most infectious stage of the disease go home to die. The whole evidence, we are of opinion, favours the theory of infection. Professor Osler's admirable illustration from the parable of the sower seems in the case of Ireland to fit the facts of the case. The seed of the disease is sown in Ireland in a soil which suits its cultivation; for in spite of the improvement noted in their conditions of life, the Irish remain an ill-nourished people, whose physical efficiency

is impaired by inferior sanitation, bad food, bad housing, neglect of the young, and by propagation from the least fit as the result of emigration. They are, therefore, subjected in a very special degree owing to the want of segregation of the sick who suffer from this disease to the influences of infection, and with the same results which, in the middle of the last century, caused the spread of typhus fever, and which in a lesser, but appreciable, degree have also followed the introduction of influenza in recent years.

ACTION TAKEN BY LOCAL AUTHORITIES.

Local authorities in Ireland in many cases have begun to take action; the poor law boards have provided in a great many instances separate accommodation in their infirmaries for consumptive patients; Belfast and Dublin boards of guardians have provided separate institutions for their consumptives. In Dublin, Cork, and Belfast movements have been set on foot to erect sanatoriums. A tremendous impetus was given last year to the movement by the active interest shown in it by the Women's National Health Association, and, under its auspices, a Tuberculosis Exhibition, which, by visiting most of the towns in Ireland, has attracted great attention to the movement, and interested the whole country in its methods. It has been the determining factor in stimulating the people to a vigorous struggle to overcome the disease, as well as an inducement to the Government to introduce special legislation to combat it.

It will be seen that in Ireland there is at the present time a great awakening with regard to the necessity for dealing with this most pressing problem. The Government and the local bodies, urged on by the great weight of public opinion, which is voiced at the public meetings held throughout the country by Lady Aberdeen's newly-formed Women's Health Association, are beginning to interest themselves in the tuberculosis question, both from the economic and infectious standpoints.

The Government, by their action in providing loans,

on specially easy terms, and free grants for housing, and by the creation of a special board with a considerable income for dealing with uneconomic holdings in the congested districts, are endeavouring to tackle the economic side of the question. The progress of this great ameliorative work is necessarily slow, and its results in reducing mortality are not as yet sufficiently apparent in the shape of statistical records, but that the benefits conferred are real and lasting no one doubts who has seen and knows the condition of the poverty-stricken people in certain rural districts of the West and South of Ireland. A word of warning, however, is desirable with regard to the application of remedies by Government which purpose dealing with the economic conditions in order to meet the special incidence of tuberculosis. Attention, we think, should not be exclusively devoted to the country districts. Our statistics have shown us that, notwithstanding their poverty, the rural districts of the west and south are in an infinitely better condition as regards the prevalence of tuberculosis than some of our large towns. If tuberculosis is to be checked by means of improvements made in our economic conditions, it would be well to concentrate more attention upon the state of the people resident in our towns, where the general and tubercular death-rates are frequently twice as high as in the congested districts. The Government, therefore, in all they have done, have not, we trust, exhausted their benevolence, as they have still open to them a vast work of economic betterment in dealing with the working classes in our city tenements.

On the other hand, the local authorities are now being placed by Parliament in a better position to deal with the sanitary and infectious side of the question. The whole of the direct action against disease is placed in their hands, and it is much to be desired that for the protection of their people, they should realise their position and take advantage of their powers to effect a reduction in the death-rate from this disease. The success or failure of the campaign against tuberculosis depends in

future on the view which local bodies entrusted with the powers for dealing with the question take of their responsibilities.

It must be remembered, however, that many of the Irish local bodies are much hampered by the poverty of their districts, and that raising extra money for the erection of hospitals and sanatoriums is a matter of considerable difficulty. It is necessary for most districts to proceed with great caution, and before incurring large expenses, which they can ill afford, they must endeavour to ascertain what system of dealing with the problem will best suit their means. Although the institutional treatment may be the one which promises the best chances of success, inasmuch as it secures the segregation of the sick from the healthy, we cannot propose in the present financial condition of the country to deal with all cases of tuberculosis by this method. We must recognise that there are limits to the erection and maintenance of institutions, and whilst a certain number are essential for the treatment of such cases as cannot otherwise be safely treated, we think that local authorities must be encouraged, having secured the isolation of the most infectious cases, to look to educative measures as the means by which a large number of their cases can be treated with due precautions in their own homes. The institutional treatment must be, therefore, regarded as essential only in such cases as cannot be suitably treated elsewhere, and its influence must be regarded as largely educative. For economic reasons, if for no other, local authorities should beware of expensive buildings; within reasonable limits, the cheaper and more temporary the buildings are the better, and the influence of the architect and the builder, except so far as they comply with these requirements, should be sternly resisted, otherwise money will be wasted where it is so sadly needed for dealing with this the most pressing of all Irish problems."



The International Congress on Tuberculosis

Washington United States of America

September 29th to October 12th 1908

This Certifies that one-half of the Grand Prize of One Thousand Dollars has been awarded to The Women's National Health Association of Ireland for evidence of effective work in the prevention and relief of tuberculosis by a Voluntary Association since 1905

Elmer Ellsworth Brown Chairman of the Organizing Committee

Lawrence T. Flick Chairman of the Executive Committee

Charles J. Higgins Chairman of the Finance Committee

Henry Rogers Chairman of the Publicity Committee

Theodore Roosevelt

President
John S. Fulton,
Secretary General



COPY OF CERTIFICATE RECEIVED FROM THE WASHINGTON AWARD COMMITTEE

Bracketing the "W. N. H. A. with the New York Association as winners of the Grand International Prize for the most effective work accomplished since 1904 by a Voluntary Association.

WASHINGTON INTERNATIONAL TUBERCULOSIS CONGRESS OF 1908.

REPORT on the Proceedings of the International Congress on Tuberculosis held at Washington from the 21st September to the 3rd October, 1908, and on Auxiliary Conferences in connection therewith held at Philadelphia, Baltimore, New York, and Boston, before and after the above Congress. By Arthur Newsholme, Esq., M.D., Medical Officer of the Local Government Board; J. Patten MacDougall, Esq., C.B., Vice-President of the Local Government Board of Scotland; and T. J. Stafford, Esq., C.B., F.R.C.S., Medical Commissioner of the Local Government Board of Ireland, the Delegates of His Majesty's Government to the above Congress.

LONDON, *9th December*, 1908.

MY LORD,

We have the honour to report that, in accordance with your instructions, we attended the International Congress on Tuberculosis held at Washington from 21st September to 3rd October. The first week was devoted to the examination and explanation of the exhibits from many countries, which were shown in the New Natural History Museum, the Head-quarters of the Congress.

The Congress was formally opened and the representatives of thirty-three different countries welcomed on the morning of 28th September by Mr. Secretary Cortelyon, who was supported on the platform by many

distinguished Americans and by the official delegates of the Governments of foreign countries. In addition to your delegates, the Royal Commission on Tuberculosis was represented by Professor Sims Woodhead, and Dr. Philip was associated with Mr. MacDougall in the official report which was submitted to the Congress regarding the progress of the tuberculosis movement in Scotland. There were also present in large numbers the representatives of many British and Foreign Universities and voluntary associations, and an audience of about 4,000 persons.

The representative of each country gave brief expression to the interest which the crusade against tuberculosis has excited, and one of us had the honour of conveying to the Congress our entire sympathy with its objects, and of outlining the past work undertaken in different parts of the United Kingdom for the prevention of tuberculosis and the new work about to be inaugurated.

The work of the Congress, which occupied the entire week, was divided into seven sections. The first section dealt with the pathology and bacteriology of tuberculosis, Dr. Wm. H. Welch, of Baltimore, presiding over its meetings. The second section was concerned with the clinical study and therapy of tuberculosis—sanatoria, hospitals and dispensaries—and had Dr. Vincent Y. Bowditch, of Boston, for its president. A third section dealt with the surgical aspects of tuberculosis; while a fourth, presided over by Dr. Jacobi, of New York, was concerned with the etiology, prevention, and treatment of tuberculosis in children. The fifth section, presided over by Professor E. T. Devine, of New York, considered the economic aspects of tuberculosis; and a sixth section, over which Surgeon General Wyman presided, dealt with the problems connected with the State and municipal control of tuberculosis. The seventh section was concerned with tuberculosis in animals and its relations to man, Dr. Leonard Pearson, of Philadelphia, being its president.

President Roosevelt was present at the closing session of the Congress, and gave an address which was enthusiastically received. In his remarks he spoke of the successful war against disease in the Isthmus of Panama, which, instead of being a byword for fatal disease, had become well nigh a Sanatorium; and of the campaign against the sleeping sickness, which is still in progress. This progress had been made possible by the turning of the trained intelligence of the medical world to the task. He concluded his remarks as follow:—

“Now, more than ever, it is understood that the great chance for advancement of the human race in material things lies in the close relationship between men of practical affairs and men of science. I feel that no gathering could take place fraught with greater hope for the welfare of the people at large than this. I thank you all for what you have done and are doing. On behalf of the Nation I greet you, and I hope you will understand how much we have appreciated your coming here.”

The King of Italy invited the Congress to hold its next meeting in Rome, in 1911, and this invitation was unanimously accepted.

The following resolutions were unanimously adopted at the closing session of the Congress:—

Resolved: That the attention of the States and Central Governments be called to the importance of proper laws for the obligatory notification by medical attendants to the proper health authorities of all cases of tuberculosis coming to their notice, and for the registration of such cases in order to enable the health authorities to put in operation adequate measures for the prevention of the disease.

That the utmost efforts should be continued in the struggle against tuberculosis to prevent the conveyance from man to man of tuberculous infection as the most important source of the disease.

That preventive measures be continued against bovine tuberculosis, and that the possibility of the propagation of this to man be recognised.

That we urge upon the public and upon all Governments the establishment of hospitals for the treatment of advanced cases of tuberculosis; the establishment of sanatoria for curable cases, and the establishment of dispensaries and day and night camps for ambulant cases of tuberculosis, which cannot enter hospitals and sanatoria.

That this Congress endorses such well-considered legislation for the regulation of factories and workshops, the abolition of premature and injurious labour of women and children, and the securing of sanitary dwellings, as will increase the resisting power of the community to tuberculosis and other diseases.

That instruction in personal and school hygiene should be given in all schools for the professional training of teachers. That whenever possible such instruction in elementary hygiene should be entrusted to properly qualified medical instructors.

That colleges and universities should be urged to establish courses in hygiene and sanitation, and also to include these subjects among their entrance requirements in order to stimulate useful elementary instruction in the lower schools.

That the Congress endorses and recommends the establishment of playgrounds as an important means of preventing tuberculosis through their influence upon health and resistance to disease.

These resolutions were, as stated above, passed, without a dissentient voice, at a meeting fully representative of the best knowledge of all countries concerning the means practicable for the diminution and final extermination of tuberculosis. It is eminently satisfactory that on such a momentous question there should be practical unanimity of scientific opinion, and of administrative aspirations; and there is thus opened up the prospect of rapid extension of administrative measures against this disease, and of much more rapid decline than in the past of the heavy mortality caused by it.

Owing to the fact that the lectures and papers contributed to the Congress have hitherto only been published in brief abstract, it is not possible for us at the present time to summarise their chief contents. We propose, therefore, as the most practical and useful course we can adopt in the circumstances, to give a short survey of the leading subjects under discussion, and to incorporate therewith a portion of the not less valuable information secured in our critical examination of the direct means adopted for the prevention of tuberculosis in a number of American and Canadian cities.

At present there is no complete knowledge of the amount of tuberculosis except of the deaths caused by it. The death-rate from pulmonary tuberculosis in different countries so far as it can be ascertained is given in the table on page 198 (Appendix A).

THE COMPULSORY NOTIFICATION OF CASES OF PULMONARY TUBERCULOSIS.

It is, however, an indispensable preliminary to effective and complete preventive measures against tuberculosis that the public authorities responsible for carrying out these measures should have accurate information of cases of, as well as of the deaths from, the disease occurring within the area over which their jurisdiction extends. This has been more than once recognised at Congresses and Conferences on Tuberculosis resolutions to that effect having been passed. The resolution quoted on page 183 brings down to date the unanimous decision of the delegates representing the medical science and public health administration of nearly every civilised country in the world. There is now no substantial opposition among those responsible for public health administration to the principle of compulsory notification of cases of tuberculosis. It is already in operation in the towns of Sheffield, Bolton, and Burnley, in England; and, as was announced at the Congress, notification of all cases of pulmonary tuberculosis

occurring in poor law practice in England and Wales will very shortly be secured. In Scotland the statutory obligation resting on the local authority to deal with and control infectious disease extends to pulmonary tuberculosis, and no hardship has been experienced therefrom; with the result that compulsory notification of this disease has already been adopted for about 15 per cent. of its total population.* In Ireland a Bill† is at the present time being promoted to secure the notification of cases of pulmonary tuberculosis throughout Ireland, subject to regulations to be issued by the Local Government Board for Ireland. The form which compulsory notification and the associated laws take in the State of New York is shown in the appended copy of the enactment for this State (Appendix B). In the City of New York pulmonary tuberculosis was made voluntarily notifiable in 1893; and in 1897 it became compulsorily notifiable, an admirable system of administrative control of the disease having been organised by Dr. Hermann Biggs.

In Massachusetts an Act was passed in 1907 requiring that every person who knows of a case of infectious or contagious disease in his house or family should notify the Select Men, or Board of Health, within six hours. The householder must disinfect to the satisfaction of the local Board of Health whenever places or articles have, in their opinion, been exposed to infection. The layman may be fined \$100 for failure to act according to this law, while the attending physician who fails to give such notice is to be fined not less than \$50 nor more than \$200 for each offence. Local Boards of Health, or Select Men, must in turn transmit the information to the State Board of Health. Empowered by a supplementary Act of the same session, this State Board, on August 8th, declared tuberculosis to be among the diseases "dangerous to the public health," and accord-

* From facts in possession of the Local Government Board for Scotland it is estimated that at least 20 per cent. of the entire population of Scotland will be under compulsory notification by 1st March, 1909.

† Bill received Royal Assent on 21st December, 1908.

ingly to fall within the statutory provisions applicable to public health.

Similar enactments are in operation in a majority of the large cities and States of America.

We had no opportunity of ascertaining to what extent the law enforcing notification is operative outside New York, but in New York the notifications are four times as numerous as the deaths, which indicates a more complete notification of cases than has been secured in any area in the United Kingdom in which notification is carried out. In New York there has been a remarkable and steady increase in the number of cases notified since 1897, when compulsory notification was introduced.

It is satisfactory to find that in the light of experience the objections to the compulsory notification of cases of pulmonary tuberculosis are rapidly disappearing.

Experience shows that both in this country and in the United States notification of cases has been valuable to the patient as well as to the community. While it has enabled each Sanitary Authority to carry out the simple precautionary measures needed to prevent spread of infection, it has brought within reach of the patient valuable official and private help, which without such notification would have been absent or deficient in amount or belated in appearance. Not only can the patient be taught how to protect himself from re-infection and his family and fellow-workers from infection, but he can be supplied with spit-bottles and other appliances, he can be guided in obtaining and continuing the necessary medical help, and he can be aided in securing sanatorium treatment. When domestic means fail, the co-operation of charitable agencies and of the Health Authority enables economical and efficient help to be given. In view of these considerations we regard the extension of compulsory notification of pulmonary tuberculosis in the United Kingdom as an indispensable step in the institution of a complete and successful organisation for the suppression of tuberculosis by the co-operation of voluntary and official agencies. As

already pointed out this, in some measure, has already been secured; and during our visit at Washington and elsewhere the value of what has already been done in these directions in the United Kingdom was fully recognised.

CO-OPERATION BETWEEN OFFICIAL AND NON-OFFICIAL AGENCIES FOR THE PREVENTION OF TUBERCULOSIS.

We were greatly struck with the extent to which private and public agencies for the prevention of tuberculosis have been successfully co-ordinated, especially in America and in Germany; and there is in the co-operation thus shown much that is interesting to those who are engaged in the battle against tuberculosis in the United Kingdom, although the principles of such co-operation are not new among us, and have in fact been largely utilised in Manchester, Edinburgh, London, and elsewhere.

A large proportion of the total papers presented to the Congress dealt with this aspect of the tuberculosis problem, and these papers, when published, will have a high practical value.

A paper by Dr. Farrand, the Executive Secretary of the American National Association for the Study and Prevention of Tuberculosis, laid down the lines of such co-operation; and the experience of the city of New York forms an excellent example of an effective organisation for carrying out the principles involved. With a view to aid the Public Health organisation the Charity Organisation Society of the City, which actively engages in constructive social work of the most valuable character, formed an influential committee comprising not only the officials of the Public Health service, but also a large number of physicians and other social workers. This committee then proceeded to arrange for educational and relief work on a large scale. The educational work is further mentioned on page 193.

The relief work was begun by collecting a fund of \$20,000 for giving help to consumptive patients and by

arranging for active co-operation with the hospitals and dispensaries already at work. The already existing local agencies of the Charity Organisation Society and of the tuberculosis dispensaries of the city were made the centres from which the new work was carried out. Overlapping of work was found to exist, and to prevent this "The Association of Tuberculosis Clinics of the City of New York" was formed, which immediately began to arrange for allotting a special district to each tuberculosis clinic (dispensary). At the present time the City of New York (Manhattan) is served by ten tuberculosis dispensaries, of which only one is directly under municipal management. Patients are required to attend the clinic in the district of their residence, and whenever application is made to the wrong clinic, the patient is promptly referred to the clinic located in the district of his residence. Patients receive free medical treatment and advice if not able to pay, and are visited regularly in their homes by experienced trained nurses. In some instances, milk and eggs are provided by the clinics as part of the treatment. Aid in the form of clothing, payment of rent and general charitable relief is given out of special funds administered by the dispensary nurse or, as is more frequently the case, through already existing benevolent organisations. Hospital and sanatorium care is secured for those who need such treatment.

The ruling principle of these dispensaries, as pointed out by Dr. Miller, the President of the Association of Tuberculosis Clinics, is that tuberculous patients "everywhere receive treatment based as much upon the social environment as upon the physical condition of each case. The study of these two factors in their relation to each other is the distinguishing feature of special tuberculosis clinics." Thus organised social science is brought to the aid of medicine. The reports upon the social conditions of the patients are furnished by the Charity Organisation Society investigators and by visiting nurses; and by their aid it has usually been possible

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to delimitate "the disputed territory of charity and therapeutics" in regard to the distribution of milk and eggs from the clinic.

The plan of co-operation is completed by daily communication with the Public Health Department. Each dispensary keeps a record of all cases treated and of all "delinquent" cases in a book provided by the Health Department. The new cases coming for treatment to the dispensary are reported by telephone every clinic day to the Health Department, and the latter has an arrangement with the dispensary in virtue of which visits and reports by the dispensary nurses are regarded as satisfactory substitutes for visits by the inspectors and nurses of the Health Department. This plan is rendered practicable by the refusal to treat dispensary patients except in their own district. "Delinquent" cases are those not returning to their proper dispensary for a period of one month except while resident in a hospital or sanatorium, or while out of town. Such patients then are visited by the inspector or nurse of the Health Department.

It is impracticable to give here the full details of the organisation in New York, and an account of a complete organisation for the control of tuberculosis would occupy still more space. Active co-operation between the dispensaries and hospitals and sanatoria is sought, and to a large extent obtained, and additional agencies are being arranged to meet the requirements of those who cannot or will not attend the dispensaries.

RELATIONSHIP BETWEEN DISPENSARIES, SANATORIA, AND HOSPITALS FOR ADVANCED CASES.

The question of the relationship between dispensaries, sanatoria, and hospitals for advanced cases in the prevention of tuberculosis was much discussed, and considerable advance has been made in our practical knowledge on this subject. Dr. Philip gave an account of his work at Edinburgh in the control of tuberculosis by

means of a well-organised dispensary,* associated with home visitation and help of the patients. He showed how such a dispensary can furnish a chief source of the notifications of pulmonary tuberculosis to the sanitary authority, and how intimately its work can be correlated with that of the sanitary authority, and with a sanatorium and with other means of institutional and domestic help. In the words of the Official Report (page 4) the result has been "an organised system which has worked well in the district in which it originated, and which the Local Government Board for Scotland has recommended as a national system."

It is becoming better understood that statistics of results of sanatorium treatment need to be compiled on a uniform basis; that statistics fulfilling this condition are hitherto scanty; but that medical experience uniformly supports the conclusion that in a large proportion of the cases treated in sanatoria permanent improvement is secured. It is also becoming appreciated that sanatoria have a most important educative influence, and that, if the number of beds is limited or patients cannot consistently with their livelihood make a long stay in the sanatorium, much good in the public interest can be accomplished by training a large number of patients during such a short stay in habits of life which, so far as their means permit, they will continue afterwards.

Dr. Arthur Latham read a paper in which he argued that sanatoria are essential to the successful treatment of pulmonary tuberculosis on a large scale, and are essential to any scheme directed toward the eradication of the disease, provided they are used intelligently as an important factor and link in a properly co-ordinated system of attack.

Dr. Paterson, of the Frimley Sanatorium, showed

* A summary of this is given in the "Official Report regarding the Anti-Tuberculosis Movement in Scotland, submitted to the International Congress on Tuberculosis, Washington, 1908, by J. Patton MacDougall, C.B., and R. W. Philip, M.D."

how in the sanatorium treatment of consumptives better medical results can be secured in suitable cases, and the work-tiredness, which is one of the dangers of sanatorium treatment, may be avoided by a system of graduated labour adapted to the individual condition of each patient.

The proceedings of the Congress comprised contributions urging the importance of providing accommodation for patients suffering from pulmonary tuberculosis in an advanced stage. This obligation to a large extent has been met in England and Scotland in infirmaries and other institutions, including an increasing use of public health hospitals for this purpose. In American cities similar provision exists. In New York this provision is made on a very large scale, and the knowledge obtained by notification is leading to a great increase in the provision of hospital accommodation already made.

In August, 1906, a tuberculosis census was taken in New York of cases of pulmonary tuberculosis at home and in hospitals. The total known cases in Manhattan numbered 22,165, which is over four times the number of deaths from this disease in the same year; and of these cases 1,461, or 6.6 per cent. of the total number, were then in institutions. The proportion of the total cases housed in institutions—chiefly advanced cases—although rapidly increasing, has been large for a considerable series of years. The removal of these centres of infection from their crowded dwellings—and only those who have seen the crowded tenements of New York can realise the significance of this—must have borne a very large share in securing the steady reduction in the death-rate from tuberculosis experienced by New York.

Director Meyer, of Berlin, in a paper on the care of patients in the advanced stage of pulmonary tuberculosis, dwelt on the risk of infection in such cases, particularly under unfavourable domestic conditions. He emphasised very properly the need for making institutions for such patients as comfortable and agreeable as

possible, the idea of segregation not being brought into prominence. He also urged the desirability of holding out some prospect of recovery to each individual patient—a most desirable step, in view of the occasional recovery of apparently hopeless cases.

We had the opportunity of visiting certain day camps, which form a most useful auxiliary to the dispensary and sanatorium. The chief aim of such camps is educational, but patients thus treated day by day, although they return to their city homes at night, commonly show great improvement.

Another useful development of the principle of helping consumptives on economical lines, which can, owing to their small cost, be adopted on a large scale, is the use of night camps. These provide for the necessities of consumptive patients, who are still able to work and cannot afford to leave their work. When the day's work is over, instead of returning to a crowded city home, the patient is admitted to the night camp, where he has the advantage of careful medical aid, of good food and of outdoor conditions of life. Such night camps can be utilised not only educationally in preventing the patient from being any longer a source of risk to his fellow-workmen, but in maintaining the improvement secured by former sanatorium treatment. Their economic value in enabling the wage-earner to continue to earn his livelihood, and in preventing the burden on the communal funds produced by incapacitating sickness, is very high.

EDUCATIVE EFFORT AGAINST TUBERCULOSIS.

The prevention of infection being one of the chief means of diminishing tuberculosis, and tuberculosis being commonly a disease of protracted duration, it is evident that education of the general public, and still more of the patients, forms a most important part of the crusade against the disease. Fortunately the idea of extreme infectivity in tuberculosis is, as knowledge is

diffused, giving way to the more sober appreciation of the fact that protracted exposure to and large doses of infection, such as are apt to occur in domestic life under unfavourable conditions, are usually needed to ensure the communication of the disease in its most active form. The more knowledge is diffused concerning tuberculosis, the more readily will reasonable precautions be taken.

In the United Kingdom the educational campaign against tuberculosis has already had much success, the National Association for the Prevention of Tuberculosis having been very helpful in this direction. A most encouraging advance in this direction has recently occurred in Ireland, where, under the auspices of Lady Aberdeen and the Women's National Health Association, a very successful exhibition has been travelling through the country, attracting great attention and exciting marked interest among the people, who have attended in large numbers to hear the lectures delivered in the various towns throughout the country by eminent medical and other lecturers. The awakening of the Irish people to the necessity of taking action has been one of the features revealed at the Congress, and the Irish Women's National Health Association shared with New York, as the Voluntary Association doing the best recent work, the honour of dividing the 1,000 dollar prize offered by the exhibition authorities.

Educational agencies for enlightening the public on the natural history and risks of the disease are being largely employed also in the United States. Of these the "travelling tuberculosis exhibit" is the most popular. Thus, the Boston Association for the relief and control of tuberculosis has an excellent exhibit of maps, charts, models of tents and shacks, sanatorium buildings, photographs, and models of "consumption breeding" tenements, and of inexpensive model housing conditions, along with a set of 200 stereopticon slides, which has already been set up in 15 cities and seen by 92,000 persons during the present year.

The corresponding exhibit of the Committee on the

Prevention of Tuberculosis of the Charity Organisation Society of the city of New York is even more elaborate. It is divided into three sections, illustrating respectively the preventability, communicability, and curability of tuberculosis. It has been shown in various parts of New York, empty premises being taken for the purpose, and in five months there has been a total attendance of over 82,000 persons.

Lectures are given in connection with these exhibitions, and a more recent development has been open-air lantern exhibitions.

During the summer, in 25 of the small parks of the city, and at five recreation piers on the river fronts, there were shown, before crowds varying in numbers from several hundred to two or three thousand, a set of stereopticon slides, giving in short sentences, easily understood, advice in relation to tuberculosis. Along with these sentences, pictures were thrown upon the screen, which "showed the ways in which the bacilli causing tuberculosis are transmitted, by the cough and expectoration of those who have it, by dust and air filled with particles of their dried sputum. They also showed the effect of the disease on the lungs; how overcrowded, dirty, badly-ventilated rooms and tenements cause and spread it; how these conditions are being remedied by new building laws; how the Department of Health cares for rooms infected with the germs of consumption by fumigation and the removal and disinfection of bedding and furnishings; how it cares for patients in the Riverside Hospital. Finally, there was set forth the possibility of arresting and even curing many cases in country sanatoria, such as that recently opened by the Department at Otisville, Orange County, New York."

Efforts of a similar kind have been undertaken through trades unions and the daily press, with the objects of creating and extending an enlightened public opinion favourable to the control of tuberculosis.

The more immediately valuable educational work is that which is undertaken in connection with actual

patients, which concerns both public health authorities and voluntary societies. In addition to the educative work done in the visiting of home-treated cases by doctors and nurses, great educational gain is secured by efficient sanatorium treatment of patients. In Boston, the class method of teaching consumptive patients has proved very successful, a weekly meeting of patients at a convenient centre being utilised not only for educational purposes, but also for mutual help and encouragement.

The teaching of patients in connection with the dispensary treatment pursued in the United States is mentioned in another connection. Experience has shown that there remains a residuum of "unteachable consumptives" who continue to be a source of danger to those who live with them. These difficulties will disappear when the general population has been instructed in general hygiene, which can only be secured, as indicated in the resolution of the Congress, quoted on p. 184, when, as urged by Dr. Heron, teachers have been efficiently instructed in hygiene, and when it has been made a chief object of teaching in elementary schools to form healthy habits and to encourage the love of cleanliness and neatness and an out-of-door life.

BOVINE AND HUMAN TUBERCULOSIS.

Since Dr. Koch at the London Congress on Tuberculosis maintained that bovine tuberculosis is a negligible factor in human tuberculosis, a large amount of scientific work has been done to elucidate the point at issue; among the most valuable of such work being that done under the supervision of the British Royal Commission on Tuberculosis, the results of which have been published in interim reports. Further contributions on the same subject were read at the Washington Congress confirming the results arrived at by the Royal Commission that both the human and the bovine types of tuberculosis occur alike in cattle and in men, although in the human being the source of infection probably is much less often of bovine than of human origin.

The Washington Congress unanimously passed the resolution quoted on p. 183, and the way is thus cleared for active administrative measures against tuberculosis in man of bovine as well as of human origin.

In conclusion we commend the resolutions of the Congress, printed on pages 183 and 184, with which we concur, to the consideration of His Majesty's Government and of the local municipal and other governing bodies in the United Kingdom. These resolutions embody the main lines on which further action, both of a legislative and administrative character, can be taken to increase the efficiency of our means for dealing successfully with tuberculosis; and we anticipate that at the next triennial meeting of the International Congress on Tuberculosis it will be possible to report more rapid advances in these particulars than have hitherto been practicable.

ARTHUR NEWSHOLME.

J. PATTEN MACDOUGALL.

T. J. STAFFORD.

The Rt. Hon. Viscount Wolverhampton, G.C.S.I.,
Lord President of the Council.

APPENDIX A

Mean Death-rates per 100,000 of Population from Pulmonary Tuberculosis in certain Countries and Cities in 1902-6.

England and Wales	119
London	- 153
Liverpool	176
Manchester	- 188
Scotland	143
Edinburgh	- 143
Glasgow	165
Ireland	- 213
Dublin	- 316
Belfast	- 290
German Empire	184 (1902-5)
Berlin	203
Hamburg	162
Copenhagen	- 145
Registration Area, U.S.A.	167
New York	- 234

APPENDIX B

CHAP. 351

An Act defining the powers and duties of local health officers and boards of health in the matter of the protection of the people of the State of New York from the disease known as tuberculosis.

Became a law, May 19, 1908, with the approval of the Governor. Passed, three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows :—

Sect. 1. *Reports by physicians and others.*—Tuberculosis is hereby declared to be an infectious and communicable disease, dangerous to the public health. It shall be the duty of every physician in the State of New

York, to report in writing, on a form to be furnished as hereinafter provided, the name, age, sex, color, occupation, place where last employed, if known, and address of every person known by said physician to have tuberculosis, to the health officer of the city, town or village in which said person resides, within twenty-four hours after such fact comes to the knowledge of said physician. It shall also be the duty of the chief officer having charge for the time being of any hospital, dispensary, asylum or other similar private or public institution in said State of New York to report in like manner the name, age, sex, color, occupation, place where last employed if known, and previous address of every patient having tuberculosis who comes into his care or under his observation, within twenty-four hours thereafter.

Sect. 2. *Examination of Sputum.*—It shall be the duty of every health officer of a city, town or village, when so requested by any physician, or by authorities of any hospital or dispensary, to make or cause to be made a microscopical examination of the sputum forwarded to him as that of a person having symptoms of tuberculosis, which shall be forwarded to such officer accompanied by a blank giving name, age, sex, color, occupation, place where last employed if known, and address of the person whose sputum it is. It shall be the duty of said health officer promptly to make a report of the results of such examination, free of charge, to the physician or person upon whose application the same is made.

Sect. 3. *Protection of records.*—It shall be the duty of every health officer of a city, town or village to cause all reports made in accordance with the provisions of the first section of this Act, and also all results of examinations, showing the presence of the bacilli of tuberculosis, made in accordance with the provisions of second section of this Act, to be recorded in a register of which he shall be the custodian. Such register shall not be open to inspection by any person other than the health authorities of the State and of the said city, town or village, and said health authorities shall not permit any such report or record to be divulged so as to disclose the identity of the person to whom it relates, except as may be necessary to carry into effect the provisions of this Act.

Sect. 4. *Disinfection of premises.*—In case of the vacation of any apartment or premises by the death or removal therefrom of a person having tuberculosis, it shall be the duty of the attending physician, or if there be no such physician, or if such physician be absent, of the owner, lessee, occupant, or other person having charge of the said apartments or premises, to notify the health officer of any city, town, or village, of said death or removal within twenty-four hours thereafter, and such apartments or premises so vacated shall not again be occupied until duly disinfected, cleansed or renovated as hereinafter provided.

Sect. 5. *Health officer to direct disinfection, cleansing or renovation.*—When notified of the vacation of any apartments or premises as provided in section four hereof, the local health officer or one of his assistants or deputies, shall within twenty-four hours thereafter visit said apartments or premises and shall order and direct that, except for purposes of cleansing or disinfection, no infected article shall be removed therefrom until properly and suitably cleansed or disinfected, and said health officer shall determine the manner in which such apartments or premises shall be disinfected, cleansed or renovated in order that they may be rendered safe and suitable for occupancy. If the health authorities determine that disinfection is sufficient to render them safe and suitable for occupancy, such apartments or premises together with all infected articles therein, shall immediately be disinfected by the health authorities at public expense, or, if the owner prefers, by the owner at his expense, to the satisfaction of the health authorities. Should the health authorities determine that such apartments or premises are in need of thorough cleansing and renovation, a notice in writing to this effect shall be served upon the owner or agent of said apartments or premises, and said owner or agent shall thereupon proceed to the cleansing or renovating of such apartments or premises in accordance with the instruction of the health authorities, and such cleansing and renovation shall be done at the expense of the said owner or agent.

Sect. 6. *Prohibiting occupancy until order of health officer is complied with.*—In case the orders or directions of the local health officer requiring the disinfection,

cleansing, or renovation of any apartments or premises, or any articles therein as hereinbefore provided, shall not be complied with within forty-eight hours after such orders or directions shall be given, the health officer may cause a placard in words and form substantially as follows to be placed upon the door of the infected apartments or premises :

“Tuberculosis is a communicable disease. These apartments have been occupied by a consumptive and may be infected. They must not be occupied until the order of the health officer directing their disinfection or renovation has been complied with. This notice must not be removed, under the penalty of the law, except by the health officer or other duly authorised official.”

Sect. 7. *Prohibiting carelessness of a person having tuberculosis.*—Any person having tuberculosis who shall dispose of his sputum, saliva, or other bodily secretion or excretion so as to cause offence or danger to any person or persons occupying the same room or apartment, house, or part of a house, shall, on complaint of any person or persons subjected to such offence or danger, be deemed guilty of a nuisance, and any persons subjected to such a nuisance may make complaint in person or writing to the health officer of any city, town, or village where the nuisance complained of is committed; and it shall be the duty of the local health officer receiving such complaint to investigate, and if it appears that the nuisance complained of is such as to cause offence or danger to any person occupying the same room, apartment, house, or part of a house, he shall serve a notice upon the person so complained of, reciting the alleged cause of offence or danger, and requiring him to dispose of his sputum, saliva, or other bodily secretion or excretion in such a manner as to remove all reasonable cause of offence or danger. Any person failing or refusing to comply with orders or regulations of the local health officer of any city, town, or village, requiring him to cease to commit such nuisance, shall be deemed guilty of a misdemeanour, and on conviction thereof shall be fined not more than ten dollars.

Sect. 8. *Protection of patient's family.*—It shall be the duty of a physician attending a patient having tuberculosis to take all proper precautions and to give proper

instructions to provide for the safety of all individuals occupying the same house or apartment, and if no physician be attending such patient this duty shall devolve upon the local health officer; and all duties imposed upon physicians by any sections of this Act shall be performed by the local health officer in all cases of tuberculosis not attended by a physician, or when the physician fails to perform the duties herein specified, and shall so report.

Sect. 9. *Providing that physicians shall make a complete statement of procedure and precautions on a blank to be furnished by the health officer, &c.*—It shall be the duty of the local health officer to transmit to a physician reporting a case of tuberculosis, as provided in section one of this Act, a printed statement and report in a form approved by the State Commissioner of Health, naming such procedures and precautions as in the opinion of the said Commissioner are necessary or desirable to be taken on the premises of a tuberculosis patient. It shall be the duty of the local health authorities to print and keep on hand an ample supply of such statements and reports, and to furnish the same in sufficient numbers to all local physicians. Upon receipt of such statement and report, the physician shall either carry into effect all such procedures and precautions as are therein prescribed, and shall thereupon sign and date the same and return it to the local health officer without delay, or, if such attending physician be unwilling or unable to carry into effect the procedures and precautions specified, he shall so state upon this report, and immediately return the same to the local health officer, and the duties therein prescribed shall thereupon devolve upon said local health officer, who shall receive the fee hereinafter provided as payment of the services of the physician if he comply with the duties herein prescribed. Upon receipt of this statement and report the local health officer shall carefully examine the same, and, if satisfied that the attending physician has taken all necessary and desirable precautions to insure the safety of all persons living in the apartments or premises occupied by the person having tuberculosis, the said local health officer shall issue an order upon the treasurer of the city, town or village in favor of the attending physician for the sum of one dollar, thereupon to be paid out of a fund which shall be

provided by said city, town, or village. If the precautions taken or instructions given by the attending physician are, in the opinion of the local health officer, not such as will remove all reasonable danger or probability of danger to the persons occupying the said house or apartments or premises, the local health officer shall return to the attending physician the report with a letter specifying the additional precautions or instructions which the health officer shall require him to take or give; and the said attending physician shall immediately take the additional precautions and give the additional instructions specified and shall record and return the same on the original report to the local health officer. It shall further be the duty of the local health officer to transmit to the physician reporting any case of tuberculosis a printed requisition, in a form approved by the State Commissioner of Health, and printed by the local health authorities and issued in sufficient number to supply local physicians. Upon this requisition blank, shall be named the materials kept on hand by the local health officer for the prevention of the spread of tuberculosis, and it shall be the duty of the local health officer to supply such materials as may be specified in such requisition. Any physician may return a duly signed requisition to the local health officer for such of the specified materials and in such amount as he may deem necessary to aid him in preventing the spread of the disease, and all local health officers shall honor, as far as possible, a requisition signed by the attending physician in such case. It shall be the duty of every local health officer to transmit to every physician reporting any case of tuberculosis, or to the person reported as suffering from this disease, provided the latter has no attending physician, a circular of information approved by the State Commissioner of Health and which shall be provided in sufficient quantity by the local health authorities. This circular of information shall inform the consumptive of the best methods of treatment of his disease and of the precautions necessary to avoid transmitting the disease to others.

Sect. 10. *Penalty for failure of physician to perform duties or for making false reports.*—Any physician or person practising as a physician who shall knowingly report, as affected with tuberculosis, any person who is

not so affected, or who shall wilfully make any false statement concerning the name, age, sex, color, occupation, place where last employed if known, or address of any person reported as affected with tuberculosis, or who shall certify falsely as to any of the precautions taken to prevent the spread of infection, shall be deemed guilty of a misdemeanour, and on conviction thereof shall be subject to a fine of not more than one hundred dollars.

Sect. 11. *Reporting recovery of patient.*—Upon the recovery of any person having tuberculosis, it shall be the duty of the attending physician to make a report of this fact to the local health officer, who shall record the same in the records of his office, and shall relieve said person from further liability to any requirements imposed by this Act.

Sect. 12. *General penalty.*—Any person violating any of the provisions of this Act shall be deemed guilty of a misdemeanour and upon conviction thereof shall be punished, except as herein otherwise provided, by a fine of not less than five dollars nor more than fifty dollars.

Sect. 13. *Repealing all Acts, &c.*—All Acts and parts of Acts contrary to or inconsistent with the provisions of this Act are hereby repealed, except that no portion of this Act shall apply to the City of New York, nor shall the passage of this Act modify or repeal any of the provisions of the charter of the city of New York, or any rule or regulation issued by the Department of Health of said New York City.

Sect. 14. This Act shall take effect immediately.

STATE OF NEW YORK, }
Office of the Secretary of State. } ss.

I have compared the preceding with the original law on file in this office, and do hereby certify that the same is a correct transcript therefrom and of the whole of said original law.

JOHN S. WHALEN,
Secretary of State.



PATIENT UNDER HOME TREATMENT
In Shelter for Consumptives, procured by Ballymena District Council
in response to request of Mid-Antrim Branch of W. N. H. A.

TUBERCULOSIS PREVENTION (IRELAND) ACT, 1908

[8 EDW. 7. CH. 56.]

ARRANGEMENT OF SECTIONS

PART I.

NOTIFICATION AND DISINFECTION.

Section.

A.D. 1908.
—

1. Notification.
2. Disinfection and cleansing.
3. Extent and adoption of Part I. of Act.

PART II.

HOSPITALS AND DISPENSARIES.

4. Provision of hospitals and dispensaries by county councils.
5. Committees of management.
6. Joint committees.
7. Classification of expenses of hospitals.
8. Expenses of committees.
9. Contributions by councils to common hospitals and dispensaries.
10. Raising of expenses.
11. Recovery of cost of maintenance of patients.
12. Saving of disqualification of patients.
13. Orders, rules, and regulations of Local Government Board.

PART III.

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—

Section.

SANITARY PROVISIONS.

14. Lectures and information relating to tuberculosis.
15. Appointment of bacteriologist.
16. Power to take samples of milk and milk products.
17. Veterinary surgeon to be officer of sanitary authority for certain purposes.
18. Destruction of cows affected with tuberculosis of the udder.
19. Powers of urban district councils in relation to dairies outside the district.

PART IV.

GENERAL.

20. Expenses of sanitary authorities.
21. Prosecution of offences and fines.
22. Interpretation.
23. Citation and extent.
24. Commencement of Act.

CHAPTER 56

An Act to prevent the spread and provide for the treat- A.D. 1908.
ment of Tuberculosis; and for other purposes con-
nected therewith. [21st December, 1908.]

BE it enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows :—

PART I.

NOTIFICATION AND DISINFECTION.

1.—(1) If any medical practitioner attending on any Notification.
person, within any district to which this Part of this Act extends, becomes aware that that person is suffering in any prescribed circumstances from tuberculosis of any prescribed form, or at any prescribed stage, the medical practitioner shall within seven days after he becomes aware of the fact send to the medical officer of health a certificate in the prescribed form and containing the prescribed particulars.

(2) The Local Government Board, after consulting with the President of the Royal College of Physicians in Ireland and the President of the Royal College of Surgeons in Ireland, shall from time to time by Order prescribe the forms and stages of tuberculosis to which, and the circumstances in which, this section shall apply, but no forms of tuberculosis shall be so prescribed save such as by reason of infective discharges are liable to communicate the disease to other persons.

(3) Any certificate required to be sent to a medical

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officer of health under this section may be sent either by delivering it to that officer, or by leaving it at his office or residence, or by sending it by post addressed to him at his office or at his residence.

(4) If any medical practitioner required by this section to send a certificate fails to send the certificate within the period specified in this section, he shall be liable on summary conviction to a penalty not exceeding forty shillings.

(5) The sanitary authority shall pay to every medical practitioner for the certificate duly sent by him in relation to a patient in their district a fee of one shilling if the case occurs in an infirmary, public hospital, or workhouse, and a fee of two shillings and sixpence if the case occurs elsewhere, but only one notification fee shall be paid by the sanitary authority in respect of the same patient.

Where the medical practitioner required by this section to send a certificate is himself the medical officer of health of the district, he shall be entitled to the fee to which he would be entitled if he were not such medical officer.

(6) A payment made to any medical practitioner in pursuance of this section shall not disqualify the practitioner from serving as a member of any county or district council or as a guardian of any union.

(7) The Local Government Board shall make regulations for carrying into effect the provisions of this section, and such regulations shall, among other matters, prescribe the form of certificate to be sent under this section and the particulars to be inserted therein, and shall provide for the proper custody of all certificates, and for securing that, so far as is, in the opinion of the Board, consistent with the public advantage, no publicity shall be given to any of the particulars contained in any such certificate, and that the certificate shall be cancelled if and when it appears to the medical officer of health that the person to whom it relates has been cured of the disease.

The sanitary authority shall gratuitously supply forms of certificate to any medical practitioner residing or practising in their district who applies for the same. A.D. 1908.

(8) In this section the expression "medical officer of health" means—

(a) As respects any district for which there is a medical superintendent officer of health, that officer; and

(b) elsewhere, the medical officer of health of the dispensary district.

2. Section one hundred and thirty-nine of the Public Health (Ireland) Act, 1878 (relative to the provision of means of disinfection), and section five (which relates to the cleansing and disinfecting of premises), section six (which relates to the disinfection of bedding), section fifteen (which relates to temporary shelter), section sixteen (which relates to penalties), and section seventeen (which relates to power of entry) of the Infectious Disease (Prevention) Act, 1890, shall apply with the necessary modifications in every case where tuberculosis is notifiable under this Act as regards any premises, bedding, clothing or articles exposed to or likely to retain infection, in like manner as if tuberculosis were an infectious disease to which those Acts apply. Disinfection and cleansing. 41 & 42 Vict. c. 52. 53 & 54 Vict. c. 34.

3.—(1) This Part of this Act shall extend to any urban or rural sanitary district in Ireland after the adoption thereof. Extent and adoption of Part I. of Act.

(2) The sanitary authority of any such urban or rural sanitary district may, subject to the approval of the council of any county in which the district is situated, adopt this Part of this Act by a resolution passed at a meeting of the authority.

(3) Fourteen clear days at least before the meeting a summons to attend the meeting, specifying the business to be transacted, and signed by the clerk of the sanitary authority, shall be sent by post to, or delivered at the usual place of abode of, every member of the sanitary authority.

(4) A resolution adopting this Part of this Act shall

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be published by advertisement in a local newspaper and by handbills, and otherwise, in such manner as the sanitary authority think sufficient for giving notice thereof to all persons interested, and shall come into operation at such time (not less than one month) after the first publication of the advertisement of the resolution as the sanitary authority may fix, and, upon its coming into operation, this Part of this Act shall extend to the district.

PART II.

HOSPITALS AND DISPENSARIES.

Provision of
hospitals and
dispensaries
by county
councils.

4.—(1) A county council may, if they think fit, provide hospitals and dispensaries for the treatment of inhabitants of their county suffering from tuberculosis, and for that purpose may—

- (a) themselves establish and maintain such hospitals and dispensaries; or
- (b) enter into an agreement with any person having the management of any hospital or dispensary for the reception, maintenance, and treatment in the hospital or for treatment in the dispensary, as the case may be, of any such inhabitants of their county as aforesaid.

(2) Two or more county councils may combine in providing a common hospital or dispensary for the purposes of this section.

(3) For the purpose of establishing a hospital or dispensary under this section a county council shall have all the powers which are conferred on county councils by subsection one and subsection two of section ten of the Local Government (Ireland) Act, 1898, and those subsections shall apply accordingly.

(4) A county council may borrow money for the purposes of this section in like manner as they may borrow for the purposes of a lunatic asylum under article twenty-

two of the schedule to the Local Government (Application of Enactments) Order, 1898. A.D. 1908.

(5) A county council shall, for every hospital or dispensary established by them, appoint—

(a) a medical superintendent having the prescribed qualifications at such salary as may be approved by the Local Government Board; and

(b) such nurses having the prescribed qualifications, and other officers and attendants, as are necessary for the requirements of the hospital or dispensary, at such respective salaries as the county council think proper,

and may dismiss any person so appointed as they think fit, excepting the medical superintendent, who shall not be dismissed without the concurrence of the Local Government Board.

5.—(1) Every hospital or dispensary established by a county council under this Act shall be managed by a committee of management appointed by the council. Committees
of manage-
ment
Provided that a county council may appoint a committee for the management of any two or more of such institutions.

(2) The committee of management shall consist of such number of members as the county council fix, and not less than three-fourths of that number shall be members of the council.

(3) The committee shall be appointed triennially, in the case of the council of a county borough at such meeting of the council as the council may determine, and in the case of the council of a county other than a county borough at the first meeting of the council after the triennial election of county councillors. Provided that in the case of the first appointment of the committee the appointment may be made at any meeting of the council, and the members of the committee so appointed shall hold office until the next following meeting of the council at which committees are to be appointed under this section.

(4) The committee of management may from time to

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time make all necessary rules for the conduct and management of the hospital or dispensary and the patients therein, and for the admission of patients, including patients admitted on special terms as to payment and accommodation. A rule made under this subsection shall not come into operation unless and until it is approved by the Local Government Board.

(5) The provisions of this section shall, so far as circumstances admit, apply in all cases where a county council enters into an agreement under this Act for the reception, maintenance, or treatment of patients in a hospital or dispensary.

(6) The Local Government Board may, by Order, regulate the procedure of committees of management and make provision for the filling of casual vacancies in such committees, including any such vacancy caused by a member of the committee ceasing to be a member of the council.

Joint committees

6.—(1) Where two or more county councils combine for the purpose of providing a common hospital or dispensary, the councils shall, subject to regulations of the Local Government Board, appoint a joint committee, with such representation thereon of each council as may be agreed upon, or in case of dispute may be determined by the Local Government Board, and the powers of the several county councils under this Part of this Act (including powers of appointing officers or borrowing) shall be exercised jointly by and through the joint committee, subject to the provisions of this Act, and as regards borrowing powers subject to regulations to be made by the Local Government Board.

(2) A joint committee shall be the committee of management of the common hospital or dispensary, and all the provisions of this Act relating to committees of management shall apply with the necessary modifications to the councils providing the hospital or dispensary and to the joint committee.

(3) Save where otherwise provided in this Act, proceedings had or taken by such joint committee shall be

had or taken in the names of the said councils jointly, A.D. 1908.
and proceedings had or taken against any such joint
committee shall be had or taken against such councils
jointly.

7.—(1) The expenses incurred by any county council or councils or committee of management in respect of any hospital established under this Act shall be classified as establishment expenses and patients' expenses. Classification of expenses of hospitals.

“Establishment expenses” shall include the original cost of providing the hospital, and of furnishing the hospital with the necessary appliances and furniture, and the cost of any extension or enlargement of the hospital, and the cost of keeping the hospital, its appliances and furniture, in a state requisite for the comfort of the patients; also the salaries of the doctors, nurses, officers, servants, and all other expenses for maintaining the hospital in a fit state for the reception of patients.

“Patients' expenses” means the cost of conveying, removing, feeding, providing medicines, disinfecting, and all other things required for patients individually, exclusive of “establishment expenses.”

(2) All expenses incurred by a county council in relation to the making or carrying out of an agreement under this Act for the reception, maintenance, and treatment of patients in a hospital shall, for the purposes of this Act, be deemed to be “patients' expenses.”

8.—(1) Subject to any conditions and restrictions which the county council or councils concerned may, with the consent of the Local Government Board, impose, all expenses incurred in relation to a hospital or dispensary under this Part of this Act shall, in the first instance, be defrayed by the committee out of a fund to be called the common fund, and all sums received or recovered by the committee shall be paid into that fund and carried to the appropriate account thereof. Expenses committees.

(2) In the common fund, separate accounts shall be kept as regards establishment expenses and as regards patients' expenses, and in the case of patients' expenses

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a separate account shall be kept for each urban or rural district in the county or counties concerned in respect of the patients who were resident in the district at the time of admission.

(3) The money required, to meet the expenses of a committee under this section shall be supplied by the county council or councils concerned upon the prescribed demand of the committee, and the money so demanded shall be a debt due from the council to the committee and may be recovered by the committee suing in the name of any member or officer of the committee.

(4) In the case of a joint committee, the demand upon each of the county councils concerned shall be a demand for the proportion payable by that council under this Act of the money so required.

(5) The accounts of every committee shall be separately kept, and shall be audited by an auditor of poor law unions designated by the Local Government Board, and all the enactments which relate or apply to the audit of the accounts of rural district councils (including the provisions of those enactments which impose penalties or provide for the recovery or payment of sums, whether in respect of the salaries of auditors or otherwise), and all orders made thereunder, shall apply to the audit of the accounts of every such committee in like manner as if the committee were a rural district council.

Contributions
by councils to
common hos-
pitals and
dispensaries.

9.—(1) The county councils establishing a common hospital shall contribute to the establishment expenses thereof in proportion to the rateable value of their respective counties, or in such other proportion as the Local Government Board may, on the joint application of all the said councils, determine.

(2) The county councils providing a common hospital shall contribute to the patients' expenses thereof the sums appearing in the books of the committee as chargeable against the several county districts in their respective counties, or, in the case of the council of a county borough, against the borough.

(3) The county councils providing a common dispen-

sary shall contribute to the expenses thereof in such proportions as may be agreed upon. A.D. 1908.

10.—(1) All expenses payable by the council of a county borough under this Part of this Act shall be raised by means of the poor rate. Raising of expenses.

(2) All establishment expenses, or the proportion thereof payable by the council of any county other than a county borough, shall be raised as a county at large charge.

(3) The amount appearing in the books of the committee as chargeable in respect of patients' expenses against any county district shall be raised as an urban charge or a district charge, as the case may require, in like manner as such charges are raised under the Local Government (Ireland) Act, 1898. 61 & 62 Vict. c. 37.

(4) Notwithstanding anything in this Act, the amount to be raised by any county council for establishment expenses in relation to any hospital or hospitals shall not in any local financial year exceed the sum which could be raised by a rate of one penny in the pound on the rateable value of the property in the county, or, in any case where the Local Government Board so consent, the sum which could be similarly raised by a rate of two-pence in the pound.

(5) All expenses payable by the council of a county other than a county borough in respect of a dispensary shall be raised in the same manner as establishment expenses incurred in relation to a hospital, and shall not in any local financial year exceed the sum which could be raised by a rate of one penny in the pound on the rateable value of the property in the county.

11.—(1) Subject to the provisions of any rules with regard to patients admitted on special terms, all expenses incurred in maintaining in a hospital a patient who is not a pauper shall be a debt due from that patient to the council, or, if he is maintained in a common hospital, to the joint committee, but proceedings for its recovery shall not be commenced after the expiration of six Recovery of cost of maintenance of patients.

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months from the discharge of the patient, or, if he dies in the hospital, from the date of his death.

Saving of dis-
qualification
of patients.

12. A person shall not suffer any disqualification or any loss of franchise or other right or privilege by reason of his or any member of his family being admitted into and maintained in any hospital provided under this Part of this Act, or being treated in any dispensary so provided.

Orders, rules,
and regulations
of Local Govern-
ment Board.

13. The Local Government Board may make such orders, rules, and regulations as they think proper—

- (a) for regulating the communications by committees to county councils and by county councils to urban district councils of the respective amounts required to be raised in each local financial year, or any part thereof, and the estimates to be made by committees of their receipts and expenditure in each local financial year;
- (b) for regulating the method of calculating the amount of patients' expenses to be charged against any county district or county borough;
- (c) for regulating the administration of hospitals and dispensaries; and
- (d) generally for the purpose of carrying this Part of this Act into effect.

PART III.

SANITARY PROVISIONS.

Lectures and
information
relating to
tuberculosis.

14. A sanitary authority may, with the approval of and subject to such conditions as may be prescribed by the Local Government Board, provide and pay for the delivery of public lectures within their district and for the distribution of pamphlets, notices, and leaflets on subjects relating to tuberculosis, and may, with the like approval and subject to the like conditions, provide any drugs or appliances which would tend to prevent or check the spread of the disease.

15.—(1) A county council may appoint for their county A.D. 1908.
a bacteriologist, being a medical practitioner, with such Appointment of bacteriologist.
qualifications and at such remuneration as may be
approved by the Local Government Board, for the
examination of meat or milk or milk products, and of
sputum or pathological specimens, and may, at their
discretion, dismiss such bacteriologist.

(2) Subject to regulations to be made by the county council, the services of such bacteriologist shall, without charge, be at the disposal of any sanitary authority within the county for which the bacteriologist is appointed.

(3) The expenses of a county council under this section shall be defrayed in like manner as establishment expenses under Part II. of this Act.

16.—(1) It shall be lawful for the medical officer of health of any dispensary district in a county for which a bacteriologist is appointed under this Act, and for any person authorised in writing in that behalf by the sanitary authority of any sanitary district in that county, to take, at any place within the dispensary district in the case of the medical officer, or within the sanitary district in the case of such other person, samples for examination or analysis of any milk or milk products produced or sold or intended to be sold within the county. Power to take sample of milk and milk products

(2) The powers conferred by this section on medical officers and other persons of taking samples within the dispensary district and sanitary district respectively may be exercised by any such medical officer or person at any place outside such district, if he has first obtained an order from a justice having jurisdiction in that place authorising the taking of such samples, which order any such justice is hereby empowered to make.

(3) Every person taking a sample under this section in pursuance of an authorisation from a sanitary authority or an order of a justice shall produce the authorisation or order if and when required.

(4) Any person who wilfully obstructs or impedes any medical officer of health or other person acting in the

A.D. 1908.

execution of this section shall be liable on summary conviction for the first offence to a fine not exceeding twenty pounds, and for the second or any subsequent offence to a fine not exceeding fifty pounds.

(5) In this section the expression "medical officer of health" includes a medical superintendent officer of health, and in relation to a medical superintendent officer of health the expression "dispensary district" means the district for which such officer is appointed.

Veterinary
surgeon to be
officer of sani-
tary authority
for certain
purposes.
41 & 42 Vict.
c. 52.

17.—(1) The expression "sanitary officer of the sanitary authority" in section one hundred and thirty-two of the Public Health (Ireland) Act, 1878, shall include any duly qualified veterinary surgeon approved by the sanitary authority for the purposes of that section, and the sanitary authority shall pay to such veterinary surgeon such remuneration as the Local Government Board may approve.

41 & 42 Vict.
c. 74.
49 & 50 Vict.
c. 32.

Destruction of
cows affected
with tuber-
culosis of the
udder.

(2) A veterinary surgeon so approved shall be deemed to be an officer of the local authority for the purpose of any order or regulation made under the Contagious Diseases (Animals) Acts, 1878 and 1886.

18.—(1) Any sanitary authority may, if they think fit, cause to be slaughtered any milch cow which is certified by a veterinary surgeon to be affected with tubercular disease of the udder.

41 & 42 Vict.
c. 52.

(2) Such sanitary authority shall, for any milch cow slaughtered under this section, pay to the owner compensation, which shall be determined in case of dispute in the manner provided by section two hundred and seventy-four of the Public Health (Ireland) Act, 1878, and shall not in any case exceed ten pounds.

(3) Where a milch cow has been slaughtered under this section, the carcase shall belong to the sanitary authority, and shall be buried or returned to the owner or otherwise disposed of by the sanitary authority according as the condition of the animal or carcase or other circumstances require or admit.

(4) Any person who wilfully obstructs or impedes any officer of the sanitary authority acting in the execution of

this section shall be liable on summary conviction for the first offence to a fine not exceeding twenty pounds, and for the second or any subsequent offence to a fine not exceeding fifty pounds. A.D. 1908.

19.—(1) The Local Government Board under section thirty-four of the Contagious Diseases (Animals) Act, 1878, as amended by any subsequent enactment, may on the application of the council of any urban district make an order authorising the council to exercise in relation to any dairies outside the district from which milk is supplied within the district all or any of the powers which may be conferred on a local authority in relation to dairies within their district by an order under the said section. Powers of urban district councils in relation to dairies outside the district. 41 & 42 Vict. c. 74.

(2) The expression “dairies” in this section includes any farm, farmhouse, yard, cowshed, milk-store, milk-shop or other place from which milk is supplied or in which milk is kept for the purposes of sale.

PART IV.

GENERAL.

20. Save where otherwise provided, all expenses incurred by a sanitary authority in the execution of this Act shall be paid as part of the expenses of such authority in the execution of the Public Health (Ireland) Acts, 1878 to 1907, and in the case of a rural sanitary authority shall be general expenses. Expenses of sanitary authorities.

21. Offences under this Act may be prosecuted and fines under this Act may be recovered under the Summary Jurisdiction Acts before a court of summary jurisdiction constituted in the manner provided by section two hundred and forty-nine of the Public Health (Ireland) Act, 1878. Prosecution of offences and fines. 41 & 42 Vict. c. 52.

22. In this Act, unless the context otherwise requires,—

The expression “hospital” includes a sanatorium;

The expression “prescribed” means prescribed by the Local Government Board;

Interpretation

A.D. 1908.

The expression "medical practitioner" means a medical practitioner duly registered under the Medical Acts;

44 & 45 Vict.
c. 62.

The expressions "veterinary surgeon" and "duly qualified veterinary surgeon," respectively, mean a person registered under the Veterinary Surgeons Act, 1881.

61 & 62 Vict.
c. 37.

Other expressions have the same meaning as the like expressions in the Local Government (Ireland) Act, 1898, and "county council" includes the council of a county borough, and "county" includes a county borough.

Citation and
extent.

23. This Act may be cited as the Tuberculosis Prevention (Ireland) Act, 1908, and shall apply to Ireland only.

Commence-
ment of Act.

24. This Act shall come into operation on the first day of July nineteen hundred and nine.

LOCAL GOVERNMENT BOARD ORDERS AND MEMORANDUM

ORDER No. 1.

TUBERCULOSIS PREVENTION (IRELAND) ACT, 1908.

Order prescribing the forms and stages of Tuberculosis to which, and the circumstances in which, Section 1 of the Act shall apply.

WHEREAS it is enacted in effect by Section 1 of the Tuberculosis Prevention (Ireland) Act, 1908 (hereinafter referred to as "the Act"), among other things that—

(1). If any medical practitioner attending on any person within any district to which Part I. of the Act extends becomes aware that that person is suffering in any prescribed circumstances from tuberculosis of any prescribed form or at any prescribed stage, the medical practitioner shall within seven days after he becomes aware of the fact send to the Medical Officer of Health a certificate in the prescribed form and containing the prescribed particulars; and that

(2). The Local Government Board for Ireland after consulting with the President of the Royal College of Physicians in Ireland and the President of the Royal College of Surgeons in Ireland, shall from time to time by Order prescribe the forms and stages of tuberculosis to which, and the circumstances in which, the said section of the Act shall apply, but that no forms of tuberculosis shall be so prescribed save such as by reason of infective discharges are liable to communicate the disease to other persons.

NOW THEREFORE, We, the Local Government Board for Ireland, in exercise of the powers given to Us by the said Section 1 of the Act and of all other powers in this behalf enabling Us, after consulting with the President of the Royal College of Physicians in Ireland and the President of the Royal College of Surgeons in Ireland, do hereby order and prescribe as follows, that is to say :—

1. In every district to which Part I. of the Act extends, Section 1 of the Act shall apply to the form of Tuberculosis, known as Tuberculosis of the Lung, at any stage at which the sputum discharged by the person suffering is in the opinion of the medical practitioner attending on such person liable to communicate the disease to other persons.

Provided that the said Section shall only apply in the following circumstances, that is to say, where the person suffering—

(1.) Habitually sleeps or works in the same room as any other person or persons not so suffering; or

(2.) Is employed or engaged in handling, preparing, or distributing milk, meat, or any other article of human food intended for sale to the public.

2. This Order may be cited as “The Tuberculosis (Conditions of Notification) (Ireland) Order, 1909,” and shall come into operation on the First day of July, 1909.



Given under Our Seal of Office, this Third day of June, in the Year of our Lord One Thousand Nine Hundred and Nine.

(Signed),

AUGUSTINE BIRRELL.
H. A. ROBINSON.
WM. L. MICKS.
T. J. STAFFORD.

ORDER No. 2

TUBERCULOSIS PREVENTION (IRELAND)
ACT, 1908.

Order making Regulations for carrying into effect the Provisions of Section 1 of the Act, in Urban and Rural Districts to which Part I. of the Act extends.

WHEREAS by Section 1 of the Tuberculosis Prevention (Ireland) Act, 1908, contained in Part I. of the said Act (hereinafter referred to as "the Act"), it is enacted in effect as follows, that is to say:—

"1.—(1) If any medical practitioner attending on any person, within any district to which Part I. of the Act extends, becomes aware that that person is suffering in any prescribed circumstances from tuberculosis of any prescribed form, or at any prescribed stage, the medical practitioner shall within seven days after he becomes aware of the fact send to the medical officer of health a certificate in the prescribed form and containing the prescribed particulars.

"(2) The Local Government Board for Ireland, after consulting with the President of the Royal College of Physicians in Ireland and the President of the Royal College of Surgeons in Ireland, shall from time to time by Order prescribe the forms and stages of tuberculosis to which, and the circumstances in which, this section shall apply, but no forms of tuberculosis shall be so prescribed save such as by reason of infective discharges are liable to communicate the disease to other persons.

"(3) Any certificate required to be sent to a medical officer of health under this section may be sent either by delivering it to that officer, or by leaving it at his office or residence, or by sending it by post addressed to him at his office or at his residence.

"(4) If any medical practitioner required by this section to send a certificate fails to send the certifi-

cate within the period specified in this section, he shall be liable on summary conviction to a penalty not exceeding forty shillings.

“(5) The sanitary authority shall pay to every medical practitioner for the certificate duly sent by him in relation to a patient in their district a fee of one shilling if the case occurs in an infirmary, public hospital, or workhouse, and a fee of two shillings and sixpence if the case occurs elsewhere, but only one notification fee shall be paid by the sanitary authority in respect of the same patient.

“Where the medical practitioner required by this section to send a certificate is himself the medical officer of health of the district, he shall be entitled to the fee to which he would be entitled if he were not such medical officer.

“(6) A payment made to any medical practitioner in pursuance of this section shall not disqualify the practitioner from serving as a member of any county or district council or as a guardian of any union.

“(7) The Local Government Board for Ireland shall make regulations for carrying into effect the provisions of this section, and such regulations shall, among other matters, prescribe the form of certificate to be sent under this section and the particulars to be inserted therein, and shall provide for the proper custody of all certificates, and for securing that, so far as is, in the opinion of the Board, consistent with the public advantage, no publicity shall be given to any of the particulars contained in any such certificate, and that the certificate shall be cancelled if and when it appears to the medical officer of health that the person to whom it relates has been cured of the disease.

“The sanitary authority shall gratuitously supply forms of certificate to any medical practitioner residing or practising in their district who applies for the same.

“(8) In this section the expression ‘medical officer of health’ means—

“(a) as respects any district for which there is a medical superintendent officer of health, that officer; and

“(b) elsewhere, the medical officer of health of the dispensary district.”

AND WHEREAS We, the said Local Government Board, after consulting with the President of the Royal College of Physicians in Ireland and the President of the Royal College of Surgeons in Ireland, did by an Order under Our Seal bearing date the third day of June, 1909, prescribe the forms and stages of tuberculosis to which, and the circumstances in which, the said section 1 of the Act shall apply :

AND WHEREAS Our said Order is directed to come into force in the first day of July, 1909 :

AND WHEREAS by sub-section (1) of section 3 of the Act it is enacted in effect that the said Part I. of the Act shall extend to any urban or rural sanitary district in Ireland after the adoption thereof :

NOW, THEREFORE, We, the Local Government Board for Ireland, by this Our Order in pursuance of the provisions of the above-cited sub-section (7) of section 1 of the Act, and in exercise of all powers in that behalf enabling Us, make the following Regulations, that is to say :—

1. In these Regulations, unless the context otherwise requires,

the expression “Tuberculosis” means Tuberculosis of the form, at the stage, and occurring in the circumstances prescribed by Our said Order of the third day of June, 1909;

the expression “statutory certificate” means the certificate required by sub-section (1) of section 1 of the Act to be sent to the Medical Officer of Health.

2. Notice of the adoption of Part I. of the Act by any Sanitary Authority, together with evidence of the fulfilment of the statutory preliminaries and a statement of

the date fixed for the coming into operation of the said Part of the Act, shall be sent to Us by the Executive Sanitary Officer of the authority adopting it not less than twenty-one days before the date so fixed.

3. Every statutory certificate shall be in the form A in the Schedule hereto annexed, and shall include all the particulars in the said form set out.

4. The forms of statutory certificate to be supplied to medical practitioners by the sanitary authority shall be bound in books, each containing twenty-five forms.

5. The forms of statutory certificate to be used by a Medical Practitioner in relation to cases of Tuberculosis occurring in an infirmary, public hospital or workhouse shall be printed on pink paper, and those to be used in relation to any other case shall be printed on white paper.

6. Where a Medical Practitioner attending upon any patient in the prescribed circumstances feels himself unable to decide whether such patient is suffering from Tuberculosis of the prescribed form and at the prescribed stage, and a Bacteriologist has been appointed for the purpose, such Medical Practitioner may forward to such Bacteriologist a specimen or specimens of the sputum of such patient for examination. On the completion of such examination the Bacteriologist shall send free of all charge to the Medical Practitioner a certificate stating whether tubercle bacilli are or are not present in the sputum. If the Bacteriologist certifies that tubercle bacilli are present in the sputum, the patient shall be deemed to be suffering from Tuberculosis, and the Medical Practitioner shall with the statutory certificate forward to the Medical Officer of Health the certificate of the Bacteriologist.

7.—(1) The Medical Officer of Health shall on receiving a statutory certificate record the particulars therein contained in a register in the form B set forth in the Schedule hereunto annexed, and shall then transmit such certificate, together with his observations as to whether any action should be

taken thereon, to the Executive Sanitary Officer of the district, who shall retain the same among the records of the Sanitary Authority.

- (2) The Sanitary Authority shall cause a record of all statutory certificates received, and of the action, if any, taken in each case, to be kept by the Executive Sanitary Officer in a Register (hereinafter referred to as "the Register of Notification") in the form C set out in the Schedule hereunto annexed.
- (3) The Executive Sanitary Officer upon receiving a statutory certificate from the Medical Officer of Health shall examine the Register of Notification and ascertain whether a statutory certificate relating to the same person has already been received, and if he shall find that such a certificate has been so received he shall at once inform the Medical Practitioner by whom the later statutory certificate was sent, and also the Medical Officer of Health, of the receipt of such earlier statutory certificate.
- (4) If no such earlier statutory certificate is recorded in the Register of Notification the Executive Sanitary Officer shall enter therein all the particulars contained in the statutory certificate, and the recommendation, if any, of the Medical Officer of Health in relation thereto, and the Sanitary Authority shall pay to the Medical Practitioner who has sent the statutory certificate the fee to which he is entitled under the Act.

8. Where the Medical Officer of Health is himself the medical practitioner required to send a statutory certificate, he shall send such certificate to the Executive Sanitary Officer, together with such recommendations, if any, as he considers necessary; and he shall not be entitled to be paid any fee in respect of such certificate until he has so sent it.

9. The Medical Officer of Health shall, within one month after the 31st day of March in each year, send to

Us a summary of the particulars (other than names and addresses) contained in the statutory certificates received by him since the 31st day of March in the preceding year, classified according to age, sex, and occupation or description.

10. The statutory certificates in the custody of the Sanitary Authority and the Register of Notification shall not be open to inspection by any person other than the Sanitary Authority, or an officer of the Sanitary Authority specially authorised by such authority in that behalf, or an Inspector of the Local Government Board, or an Auditor of Poor Law Unions designated by the Board to audit the accounts of the Sanitary Authority; and the Sanitary Authority shall not permit the particulars contained in any such certificate or register to be divulged in any such manner as to disclose the identity of any person to whom such particulars relate.

11. If the Medical Officer of Health is at any time satisfied that any person in relation to whom a statutory certificate has been sent has been cured of tuberculosis of the prescribed form, he shall send a certificate to that effect to the Executive Sanitary Officer, and thereupon the statutory certificate and the corresponding entry in the Register of Notification shall be cancelled by stamping or writing the word "Cancelled," together with the date, across such statutory certificate and entry.

12. This Order may be cited as the Tuberculosis Regulations (Ireland) Order, 1909, and shall come into operation on the First day of July, 1909.



Given under Our Seal of Office, this
Twenty-first day of June in the
Year of Our Lord One Thousand
Nine Hundred and Nine.

(Signed),

H. A. ROBINSON.
WM. L. MICKS.
T. J. STAFFORD.

THE SCHEDULE.

Counterfoil

No. _____

FORM A.

THE TUBERCULOSIS PREVENTION (IRELAND) ACT, 1908.

No. _____

CERTIFICATE OF MEDICAL PRACTITIONER.

_____ District (County Borough).

I hereby certify that in my opinion

Name _____

Name _____

Address _____

Address _____

Sex _____

Sex _____

Age _____

Occupation or }
Description { _____

Age _____

is suffering from Tuberculosis of a form and at a stage to which and in circumstances in which Section 1 of the Tuberculosis Prevention (Ireland) Act, 1908, applies.

Occupation }
or
Description { _____

Dated the _____ day of _____ 19 _____

Signed _____

Date of sending
Certificate

Medical Practitioner.

(Address) _____

The Medical (Superintendent) Officer of Health,

_____ District (County Borough)

* If no attention is desired the word "No" must be inserted here, and a specific statement added below showing what preventive measures are being adopted. The Medical Officer of Health will then advise whether the Sanitary Authority should intervene or not.

* _____ ATTENTION DESIRED.

(The following must be printed on the back of every form of certificate.)

The Local Government Board for Ireland, after consulting with the President of the Royal College of Physicians in Ireland and the President of the Royal College of Surgeons in Ireland, have, by The Tuberculosis (Conditions of Notification) (Ireland) Order, 1909, prescribed as follows :—

In every district to which Part I. of the Act extends, Section 1 of the Act shall apply to the form of Tuberculosis, known as Tuberculosis of the Lung, at any stage at which the sputum discharged by the person suffering is in the opinion of the medical practitioner attending on such person liable to communicate the disease to other persons.

Provided that the said Section shall only apply in the following circumstances, that is to say, where the person suffering—

(1.) Habitually sleeps or works in the same room as any other person or persons not so suffering; or

(2.) Is employed or engaged in handling, preparing, or distributing milk, meat, or any other article of human food intended for sale to the public.

[SCHEDULE.

MEMORANDUM

TUBERCULOSIS PREVENTION (IRELAND)
ACT, 1908.

MEMORANDUM ON THE OBJECTS OF THE ACT.

The main aim and object of the Act and of the Regulations made under it is to place further power in the hands of Local Authorities for preventing the spread of Tuberculosis. Part I. of the Act deals with the Notification of Tuberculosis and Disinfection of premises used by Tuberculous patients.

NOTIFICATION OF PULMONARY TUBERCULOSIS.

Notification of Pulmonary Tuberculosis is now generally regarded as a necessary preliminary to definite action on the part of a Sanitary Authority. Before active steps can be taken, it is essential that persons suffering from certain forms of the disease should be located, and through the form of notification provided for in the Regulations the important point is gained that the Sanitary Authority will be placed in possession of information of the presence of the disease in households where conditions likely to foster its spread exist. They will be enabled thereby to bring into operation certain machinery, mainly of an educative nature, for helping the patient to arrest the disease, and for teaching his friends and members of his family how to avoid contracting it.

Tuberculosis is usually communicated from person to person as a result of prolonged exposure or contact under conditions which generally lead to impaired health, such as overcrowding, insanitary surroundings, insufficient or improper nutrition. As these are conditions which the Sanitary Authority may for the most part either mitigate or remove, it is of prime importance that they

should have early and accurate knowledge of the locality of persons suffering from the disease.

The Act limits Notification to cases of Tuberculosis which are a danger to others owing to the infectious nature of the discharge from the patient, and the Local Government Board, aided by the advice of the Presidents of the Royal Colleges of Physicians and Surgeons, as provided for in the Act, when making their Regulations under Section 1 (2), had in view this fact, and they have limited Notification to those cases in which they deem it imperative that precautions should be taken—namely, to Tuberculosis of the Lung in the case of sufferers so circumstanced that they are likely to prove a means of distributing the disease unless precautionary measures are adopted.

The Regulations, therefore, made by the Local Government Board under the Act make provision for the notification of such cases only as are housed or work under conditions which may be dangerous to others. Further, the notification form provides that, even when these conditions are present, the physician in attendance may, when notifying in cases where he desires to take the full responsibility of seeing that precautionary measures are carried out, request the Medical Officer of Health not to intervene or direct an inspection by the officers of the Sanitary Authority. By these means it is hoped to spare patients any unnecessary intrusion, and to limit notification and subsequent action by the Sanitary Authority, after notification, to cases where intervention is essential, and all that is sought to be done is to educate and impress upon the sufferers what they should do so as to lessen the danger to their friends and those with whom they come habitually in contact.

As notification is made to a Sanitary Authority with the double object of helping the sufferer and protecting others from contracting the disease, it is of importance that the presence of Tubercle in the Lung should be recognised at an early stage of the disease, and as this is not always an easy matter to determine, provision is

made in the Act and Regulations that the services of a Bacteriologist may be retained and placed at the disposal of medical practitioners who have a reasonable doubt whether or not the disease is in certain cases Tubercular. For this reason it is most desirable that, wherever Part I. of the Act is adopted, a Bacteriologist should be employed to examine samples of sputum in order to determine whether the Tubercle Bacillus is present.

Notification of Tuberculosis is an important step which a Sanitary Authority may now take to insure prevention of the disease, and the procedure for taking this step is laid down in Section 3 of the Act. It must, however, be understood that notification is merely a means to an end, and that the knowledge of the location of the disease in the district of a Sanitary Authority is only a first step towards further action.

It was the desire of the Legislature in introducing the principle of compulsory notification of Tuberculosis to safeguard the sufferers from unnecessary intervention or publicity to the greatest extent compatible with the public interest. Consequently the penal provisions applicable to other infectious diseases under the Public Health Acts have not been extended to Tuberculosis, and there is no power given to Sanitary Authorities for compulsory removal of patients to hospital. Moreover, it is expressly provided that no undue publicity shall be given to the particulars contained in the medical practitioner's certificate in a case of Tuberculosis, and it will be the duty of Sanitary Authorities to give effect to the clear intention of Parliament by enjoining secrecy on all their officers, who, in the course of their duties, may have custody of the forms of notification or knowledge of their contents. It will, therefore, be advisable for Sanitary Authorities to entrust reliable officers with this portion of their sanitary administration, and to impress upon those officers that any disregard of the obligation of secrecy will be treated as a serious breach of discipline.

It is also very desirable that in appointing officers or

health visitors to carry out inspections and give advice, where possible, women of experience, such as trained nurses, selected for their knowledge, sympathy, and tact, should be employed by the Sanitary Authority to discharge the delicate duties devolving on them in advising the sufferers and their friends.

When Tuberculosis of the Lung has been notified as being present in the class of cases provided for in the Order, it then becomes the duty of the Sanitary Authority, through their officers, to aid the person suffering, and those who live with him, by advice and instruction, in order that if the patient is not provided for in a special institution, he may so live in his home as to give himself the best chance of recovery and those who associate with him the greatest protection from contracting the disease. The notification of one case in a family is likely in practice to reveal the fact that other members of the family are, in many instances quite unconsciously, suffering from the disease in an incipient stage, and the early discovery of this fact is a matter of the greatest importance both to the sufferers and others. Inquiry by the officers of the Sanitary Authority will, in many instances, also bring to light insanitary surroundings and other matters which require to be remedied. In this way, through notification, such questions as defective housing, bad ventilation, and other sanitary defects, are brought directly under the notice of the Sanitary Authority.

DISINFECTION.

When a case of Tuberculosis has been notified, the Sanitary Authority, upon the certificate of the Medical Officer of Health or other medical practitioner, will be in a position to require the cleansing and disinfection of any house or part of a house in which the patient is lodged, and of any article therein likely to retain infection. The duty of complying with the Sanitary Authority's requisition for cleansing and disinfection rests primarily with the

owner or occupier of the house, and is to be performed to the satisfaction of the Medical Officer of Health, but in the absence of action by the owner or occupier, the Sanitary Authority may intervene, and the expenses incurred may be recovered from the owner or occupier. If, however, the latter is unable to carry out disinfection effectually, the work may be done by the officers of the Sanitary Authority at the cost of the rates.

The further power is conferred on the Sanitary Authority to require any bedding, clothing, or other articles which have been exposed to the infection of Tuberculosis, to be delivered to their officers for the purpose of disinfection. In such circumstances it devolves on the Sanitary Authority to disinfect the articles and return them to the owner free of charge, while in the event of unnecessary damage compensation is to be paid.

The power of disinfecting houses, bedding, &c., in cases of Tuberculosis during the progress of the disease, and also in cases where the patient dies or removes to hospital or elsewhere, is a matter of considerable importance from the point of view of preventing its spread.

Part II. of the Act deals with the establishment and management of special Hospitals and Dispensaries. irrespective of whether the notification clauses of the Act have been adopted by any District Council, the County Council may at once proceed to provide for the wants of their county by supplying hospital accommodation or dispensaries, and do all the acts they are authorised to do under the powers conferred by Part II. It is well, however, that there should be co-operation between Sanitary Authorities and County Councils in regard to the interchange of information relating to the prevalence of Tuberculosis, and the results of notification should in an impersonal form be placed at the disposal of County Councils with a view to assisting them to judge of the extent of accommodation required for cases of Tuberculosis. It will be the aim of the Local Government Board to furnish County Councils periodically with summary returns of notifications of Tuberculosis in any sanitary

district within the county where notification has been adopted.

HOSPITALS.

In every county there will be a certain number of cases either in the early or late stages of the disease for which it is highly desirable on account of their condition or surroundings to provide accommodation in either a Sanatorium or a Hospital. From the point of view of the prevention of the disease, the advanced cases are those for which institutional treatment will be most urgently required. It should, therefore, be the aim of County Councils to provide for each county a certain number of beds for the separate treatment of such cases, and this can probably in most instances best be done either by arrangement with existing institutions or by the conversion of disused or partially used institutions. County Councils, therefore, would do well in the first instance to devote their energies to providing for the late cases, as it is from these the greatest danger arises of spreading the disease. Similarly, with regard to the early cases, an effort should be made to provide accommodation either in an existing Sanatorium or by the erection of a Sanatorium for the county or for a group of counties. In connection with the erection of such institutions, it is eminently desirable that extravagant buildings involving a large capital outlay should not be embarked upon; light, cheap buildings of a semi-permanent nature should rather be aimed at, than costly structures.

DISPENSARIES.

The bulk of the cases, and particularly of the early cases, must, in the natural course of events, for years to come be treated in their own homes. The recognition of this fact, due in the first place to the want of sufficient beds in institutions for the enormous number of cases of Tuberculosis in this country, and in the second place to the difficulty for many reasons of persuading sufferers to go to hospital, forces us to find some system by means of which the patient may be afforded a fair chance of re-

covery and the community may be protected from the danger of his living and working without due precautions in their midst. The dispensary system, if properly carried out, provides this form of treatment and education. The greatest benefit to be derived from the Sanatorium, so far as the public are concerned, is the education of the patient. In the dispensary system, as now practised, it is endeavoured to teach this lesson without the costly preliminary of undergoing treatment in a Sanatorium.

The dispensary system, as it has been developed and worked by Dr. Philip, of Edinburgh, and by others, is now largely adopted in foreign countries, notably in Belgium, France, Germany, and the United States of America. Though spoken of as a dispensary, it is in reality much more than a mere out-patient department of a hospital; it is rather an educational depôt or clearing house through which nearly all the cases of Tuberculosis in a district are passed. It is intimately connected with and supervised by the Medical Officer of Health, and its functions are to attend to all cases of Tuberculosis in the area it serves. Some of its cases it drafts into a Sanatorium, others it places in Hospitals, the remainder it looks after in their own homes through the services of the Medical Officer and a staff of nurses or health visitors. By means of systematic teaching and nursing the dispensary makes it possible for many people to carry on their ordinary work, and for large numbers who cannot or will not enter an institution to be treated with comparative safety at home.

The dispensary is one of the most effective first steps which a County Council, and, more particularly, a County Borough Council, can take in Ireland for the prevention of the disease. Around a well-managed dispensary it will eventually be found that an effective system of provision for consumptives will grow up. The dispensary is not intended to take the place of the Hospital or Sanatorium, but rather to supplement the work of these institutions. It is a system which is well worth

consideration and examination by County Councils as affording a cheap and efficient means of dealing with a large number of consumptive cases.

LITERATURE, &C.

In Part III. of the Act will be found several useful provisions with which County Councils and Sanitary Authorities are armed with the object of preventing Tubercular disease. One section deals with the distribution of approved literature, and with lectures designed to educate the public as to the infectious character of Tuberculosis and the means of avoiding infection. When we remember the importance of a clear knowledge of the causes of the disease, the necessity for educating the public on the subject is apparent. The Local Government Board will be prepared from time to time to consider applications from Sanitary Authorities who desire to provide lectures and literature which may be useful in disseminating knowledge upon this subject.

Drugs or appliances which would tend to prevent or check the spread of the disease may also be provided by Sanitary Authorities subject to the controlling direction of the Local Government Board. The appliance which will be most useful in consumptive cases is the special "spit bottle," the use of which should be impressed upon every consumptive patient.

MILK.

Another section deals with the elimination from dairy herds of milch cows affected with Tuberculous disease of the udder, and provides for payment of compensation in certain cases for the destruction of diseased animals. Another supplies the long-felt want of many Urban Authorities, who derive their milk from rural districts where inadequate means are taken to provide a clean and wholesome supply. The section empowers Urban Authorities under certain conditions to send their Inspectors outside their own districts and into the district from whence they derive their milk supplies to investi-

gate, and, if necessary, to enforce cleanliness and proper supervision in such dairies and cowsheds. The object of the sections dealing with milk is to secure a clean milk supply free from tubercular infective matter, and the power given to Urban Districts to defend their inhabitants from the ill-effects of an impure milk supply should have the effect of levelling up the standard of cleanliness in connection with dairies and cowsheds in rural districts.

These short comments on the objects of the Act may serve to bring home to County Councils and Sanitary Authorities some idea of the new powers conferred upon them with a view of lessening the number of cases of Tuberculosis in their districts. It cannot be too prominently put forward and insisted upon that this Act, and particularly the Notification Clauses contained in Part I., which is the portion requiring adoption by Sanitary Authorities, is conceived with the intention of helping and not of penalising sufferers from this very fatal disease. It is not intended to inflict hardship of any kind upon individuals, and every care should be taken by Sanitary Authorities and their officers in administering the Act to see that nothing but benefit accrues to the community by the adoption of Notification and by the use of the other clauses contained in the Act.

SUMMARY OF PROVISIONS.

Part I. of the Act, which relates to Notification and Disinfection, is adoptive, and may be put in force by any Sanitary Authority on complying with the prescribed procedure.

PROCEDURE FOR ADOPTION.

Special notice is required to be sent by post to or delivered at the usual place of abode of every member of the Sanitary Authority fourteen clear days at least before the meeting at which the question of the adoption of Part I. of the Act is to be considered.

If, at such meeting, it is decided to adopt Part I., a

resolution to that effect should be passed and forwarded for the approval of the Council of the County within which the Sanitary District is situated.

On receiving an official intimation of the approval of the County Council, the Sanitary Authority should give public notice of their resolution by advertisement in a local newspaper and by handbills, and in such other manner as they may think sufficient. The Sanitary Authority should also fix the time at which the provisions of Part I. of the Act are to come into operation, and which must not be less than one month from the first publication of the advertisement.

NOTIFICATION OF TUBERCULOSIS.

As soon as Part I. has become operative, it will be the duty of every medical practitioner attending within the district, what for convenience and subject to the explanation given below, may be termed a "prescribed" case of Tuberculosis, to furnish particulars on an official form to the Medical Officer of Health. This expression is defined by the Act to mean the Medical Superintendent Officer of Health in a district where such officer has been appointed, and elsewhere the Medical Officer of Health of the Dispensary District.

If a medical practitioner fails to comply with this requirement of the Act he renders himself liable to a penalty not exceeding £2.

PRESCRIBED FORMS, STAGES, AND CIRCUMSTANCES.

It is to be observed that the Act does not apply the principle of notification indiscriminately to all cases of Tuberculosis, but empowers the Local Government Board, after consulting with the President of the Royal College of Physicians in Ireland and the President of the Royal College of Surgeons in Ireland, to prescribe by Order from time to time the forms and stages of Tuberculosis to which, and the circumstances in which, the provisions as to notification shall apply, subject, however, to the condition that only forms of Tuberculosis which by

reason of infective discharges are liable to communicate the disease to other persons, may be prescribed.

In carrying out this statutory duty, the Board have, after conferring with the Presidents of the Royal Colleges before mentioned, prescribed that in every district to which Part I. of the Act extends, Section 1 of the Act shall apply to the form of Tuberculosis, known as Tuberculosis of the Lung, at any stage at which the sputum discharged by the person suffering is in the opinion of the medical practitioner attending on such person liable to communicate the disease to other persons.

Provided that the said Section shall only apply in the following circumstances, that is to say, where the person suffering—

(1.) Habitually sleeps or works in the same room as any other person or persons not so suffering; or

(2.) Is employed or engaged in handling, preparing, or distributing milk, meat, or any other article of human food intended for sale to the public.

A medical practitioner is therefore only obliged to notify such cases as comply with these conditions. The certificate of Notification should be sent to the Medical Officer of Health, but wherever a Medical Superintendent Officer of Health is appointed, all notifications should be addressed to him.

FEES FOR NOTIFICATION.

The medical practitioner is entitled to be paid by the Sanitary Authority in respect of each notification duly sent by him a fee of 1s. if the case occurs in an infirmary, public hospital, or workhouse, or of 2s. 6d. if the case occurs elsewhere, but it is expressly provided in the Act that only one notification fee shall be paid by the Sanitary Authority in respect of the same patient. In order to comply with this requirement it will be necessary for a full and accurate record of all patients notified to be kept by the Sanitary Authority, to which reference may be made as each case is notified.

Where the Medical Officer of Health is the medical

practitioner in attendance, he may be paid a notification fee in the same way as an ordinary medical practitioner, even when he notifies to himself. Where a Medical Superintendent Officer of Health is appointed, he should notify to that officer.

The receipt of a notification fee is not to disqualify any medical practitioner from serving as a member of any county or district council or as a poor law guardian.

REGULATIONS.

It devolves on the Local Government Board to make regulations for carrying into effect the provisions relating to the notification of Tuberculosis. These regulations are to include the form of notification certificate, and to provide for the custody and secrecy of notification certificates, and for the cancellation of such certificates in any case where the patient may have been cured of Tuberculosis. The particulars to be inserted by the medical practitioner in the certificate of notification will be the patient's name, address, age, sex, and occupation. Blank forms of certificate are to be provided by the Sanitary Authority and furnished on application without charge to any medical practitioner residing or practising in the district.

DISINFECTION IN CASES OF TUBERCULOSIS.

Having through the notifications obtained knowledge of cases of Tuberculosis that call for administrative action, it will be competent for the Sanitary Authority to exercise their powers under Section 2 of the Act for preventing the spread of the disease, which consists of the application of certain sections of the Public Health Acts relating to infectious disease.

These empower a Sanitary Authority to provide a proper place for disinfection, with apparatus and attendance, to which infected articles may be brought to be disinfected free of charge.

The Sanitary Authority will also be in a position to require the cleansing and disinfecting of any house or part

thereof where such a course is certified by the Medical Officer of Health or any other registered medical practitioner as likely to prevent or check the spread of Tuberculosis.

Should the owner or occupier of the premises not at once proceed to carry out disinfection to the satisfaction of the Medical Officer of Health, it becomes the duty of the officer of the Sanitary Authority under the superintendence of the Medical Officer of Health to carry out the necessary disinfection. The cost may be recovered in a summary manner from the owner or occupier.

If the owner or occupier is, in the opinion of the Sanitary Authority or of the Medical Officer of Health, unable to carry out the work of disinfection effectually, the Sanitary Authority may, without notice, but with the consent of the owner or occupier, do the work at their own expense.

The Sanitary Authority, or the Medical Officer of Health acting under a formal authorisation, may require the delivery of infected articles to an officer of the Sanitary Authority for the purpose of removal for disinfection.

The articles are to be disinfected by the Sanitary Authority and returned free of charge.

Compensation for unnecessary damage incurred in the process of disinfection may be paid.

Temporary shelter or house accommodation shall be provided free of charge for the members of any family who are compelled to leave their dwelling while disinfection is being carried out by the Sanitary Authority.

A penalty not exceeding £5 is imposed for obstructing a duly authorised officer of the Sanitary Authority in carrying out the provisions relating to disinfection, and the officers are given a right of entry on premises for the purpose of disinfection.

HOSPITALS AND DISPENSARIES.

Part II. of the Act, unlike Part I., does not require any formal adoption. It deals with the provision by the Council of any County (including the Town Coun-

cil of a County Borough), of hospitals, sanatoriums, and dispensaries for the treatment of inhabitants of their county or county Borough suffering from Tuberculosis. This provision may be made, if the Council think fit to make it, either by the establishment and maintenance by the Council of such hospitals and dispensaries or by entering into an agreement with those who have the management of any hospital or dispensary, for the maintenance and treatment in such hospital or the treatment in such dispensary of any inhabitant of the county or county borough suffering from Tuberculosis, or by combining with some other Council or Councils for the establishment of a common hospital or dispensary.

Where a Council have themselves established a hospital or dispensary, they will be bound to appoint—

- (a) A Medical Superintendent possessing such qualifications as the Local Government Board may prescribe at such salary as the Board may approve—this officer cannot be dismissed without the Board's concurrence.
- (b) Such nurses, having qualifications to be prescribed by the Board, and such other officers and attendants as are necessary for the requirements of the institution at such salaries as the Council think proper.

Every hospital or dispensary established under the Act will be managed by a Committee of Management, the size of which will be fixed by the County Council, and which, to the extent of three-fourths, must consist of members of the County Council. The members of the Committee will be appointed triennially in the case of a County Borough at such meeting as the Council may fix, and in the case of any other County Council at the first meeting after the ordinary triennial election of County Councillors.

The Committee of Management is empowered to make, subject to the approval of the Local Government Board, all necessary rules for the conduct and manage-

ment of the hospital or dispensary and for the admission of patients.

In the case of two or more Councils combining for the purpose of establishing a common hospital or dispensary, those Councils will appoint a Joint Committee in such proportions as may be agreed upon, or, in case of dispute, as may be determined by the Local Government Board. It will rest with the Joint Committee to establish the common hospital or dispensary for the combined counties, to appoint officers, and to exercise the powers of borrowing.

In addition, the Joint Committee will, in relation to the management of the common hospital or dispensary, possess all the powers of a Committee of Management.

It should be borne in mind that the expression "Hospital" is defined by the Act to include a Sanatorium.

PROVISIONS AS TO EXPENSES.

The expenses incurred in respect of any hospital established under the Act are to be classified as establishment expenses and patients' expenses.

Establishment expenses will include the cost of the establishment, extension, equipment and maintenance of the hospital, together with the salaries of officers, while patients' expenses will consist of the cost of conveying, removing, feeding, providing medicines, disinfecting, and all other things required for patients individually exclusive of establishment expenses, and are to include the costs incurred under agreements with other hospital authorities.

All expenses of a Committee are to be defrayed out of a common fund, in which separate accounts of establishment expenses and patients' expenses are to be kept. Under the latter heading, a separate account is to be kept for each urban or rural district in the county or counties concerned in respect of the patients who were resident in the district at the time of admission.

The funds required to meet the Committee's ex-

penses are to be supplied by the County Council or Councils on the demand of the Committee.

In a County Borough, all expenses are to be raised by means of the poor rate. In other counties, establishment expenses are to be levied as a county-at-large charge, while patients' expenses are to be charged against the county district concerned, and to be raised as an urban charge or a district charge, according as the district is urban or rural.

The amount that may be raised in any one year by a County Council for the establishment expenses of any hospital or hospitals established under the Act is limited to the produce of 1d. in the £ on the rateable value of property in the county, but the limit may be increased with the consent of the Local Government Board to 2d. in the £.

The expenses connected with a dispensary elsewhere than in a county borough are to be raised in the same manner as the establishment expenses of a hospital, and are subject to a limit of 1d. in the £.

It is provided that, subject to any rules with regard to patients admitted on special terms, the expenses of maintaining in hospital a patient who is not a pauper shall be a debt due from that patient to the Council or Joint Committee, but proceedings for recovery shall not be instituted after six months from his discharge or death in hospital.

No loss of franchise or other disqualification is to follow from admission to a hospital or treatment at a dispensary.

Powers are given to the Local Government Board to make orders and rules regulating the procedure of Hospital Committees, their financial business, and the administration of hospitals and dispensaries.

MISCELLANEOUS PROVISIONS.

Part III. of the Act, like Part II., does not require any formal resolution of adoption by a Local Authority: it comes into force automatically on the 1st July,

1909, and its provisions may be made use of on and after that date by any Sanitary Authority or County Council as the case may be. This Part contains miscellaneous provisions intended to deal with the prevention of Tuberculosis. Sanitary Authorities, subject to the control of the Local Government Board, may arrange for public lectures and for the distribution of literature on subjects relating to Tuberculosis, and they may provide drugs and appliances, for example, spitting flasks, for the purpose of checking the spread of Tuberculosis.

Power is given to County Councils to appoint a bacteriologist, being a medical practitioner, for the examination of meat or milk or milk products, and of sputum or pathological specimens. His services, subject to regulations to be made by the County Council, are to be at the disposal without charge of any Sanitary Authority in the County. The cost is to be defrayed as a county-at-large charge.

In any County in which a bacteriologist has been appointed, power is given to any Medical Officer of Health or any person acting under a written authorisation from a Sanitary Authority, to take within the sanitary district samples of milk or milk products for examination or analysis. The like powers may be exercised outside the district under the authority of a Justice's Order.

Penalties for obstruction are imposed, amounting in the case of a first offence to £20, and in the case of subsequent offences to £50.

By virtue of the extended meaning given to the expression "sanitary officer" in Section 132 of the Public Health (Ireland) Act, 1878, it will be open to a Sanitary Authority to approve of a qualified Veterinary Surgeon as an officer for the inspection and detection of unsound food. Hitherto the power of inspection and seizure has been confined to Medical Officers of Health and Sanitary Sub-Officers. The remuneration of such Veterinary Surgeon will be subject to the Board's approval,

and he will automatically become an officer of the local authority for the administration of the Dairies, Cow-sheds and Milkshops (Ireland) Order of 1908.

Where a Veterinary Surgeon certifies any milch cow to be affected with Tubercular disease of the udder, the Sanitary Authority may cause the animal to be slaughtered, and may pay the owner compensation, the amount of which is, in case of dispute, to be determined according to the provisions of Section 274 of the Public Health (Ireland) Act, 1878, but shall not in any case exceed £10. The carcase shall belong to the Sanitary Authority, and shall be buried or returned to the owner or otherwise disposed of as the circumstances require.

Power is given to the Local Government Board to confer on the authorities of urban areas the right of supervising dairies in outside districts from which the milk supplies of their own districts are derived, and this provision is intended to afford a remedy in cases where Rural Sanitary Authorities fail or refuse to take the proper steps for exercising suitable control over the dairies in their districts from whence milk is being supplied to the inhabitants of the aggrieved urban district.

All expenses incurred by Sanitary Authorities under the Act will, except where otherwise provided, be paid as part of the expenses of the execution of the Public Health Acts, and, in the case of a Rural Sanitary Authority, shall be general expenses.

LOCAL GOVERNMENT BOARD,
DUBLIN, *June, 1909.*

Date Due _____

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